ELECTRICAL WEST

November 1950
25 cents

Valley Development By Enterprise, Page 61
Appliances, Page 85

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

"every day in every way..."

Some years back, you may remember, "every day in every way" was the basis of a movement which gained widespread popularity. And it wasn't only optimism which made it popular—it was the repetition as well.

It's an acknowledged fact that repetition is a potent factor in selling. The movement of customers toward your store, for instance, is increased by advertisements like these in the current Edison series on electric ranges and water heaters. They tell your customers about the benefits they'll get—and that they'll get these benefits every day.

For another example of the selling power of repetition, consider the part Edison advertising plays in your business. You profit because it has been building recognition of your merchandise and your service for more than half a century!

SUN

MON

TUES

WED

THUR

FRI

SAT

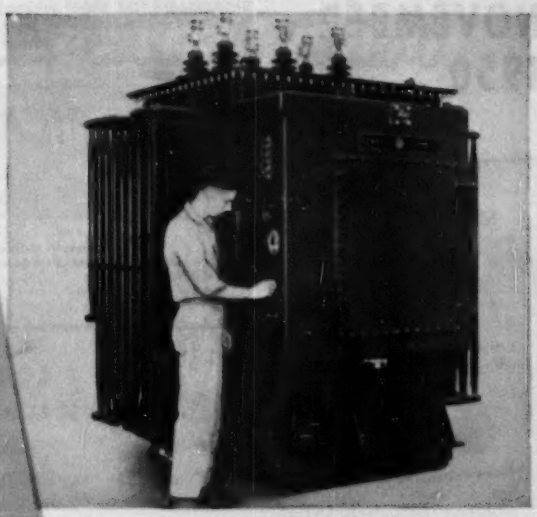
SOUTHERN CALIFORNIA EDISON COMPANY

Edison

Improved

General Electric's 3-phase 32-step voltage regulator

Is now even better than before



Now up to 2500 kva

in standard ratings. Voltages up to 69,000 volts, 3-phase. 10% raise and 10% lower in 32 equal steps.

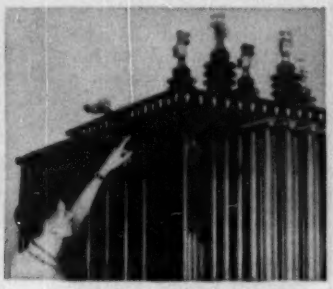
Redesigned Control Panel Includes

New simplified voltage-regulating relay with fixed holding coil adjustment.
New test rheostat for convenient voltage-level adjustment.
New current-testing terminals.
New reversing switch for reactance element of line-drop compensator.
New larger, easier-to-read position indicator.
A handy utility shelf for instrument.

Switch Compartment More Accessible

Large hinged door permits much easier inspection and servicing of an improved switching mechanism.

Time-tested Geneva Gear Drive meets exacting requirements of shockless, quick-break action, accurate positioning of the contacts throughout the switching cycle, and firm locking on each operating position without latches or brakes.



Added Oil Life

Main tank now completely sealed with Nitrile rubber gaskets. Protects oil from oxidation, sludging, and absorption of water.

New General Electric NLT32 Step Voltage Regulator is now in production. Shipments are short. New design means even lower maintenance, more convenient inspection, easier tuning—plus accurate, dependable voltage regulation.

New bulletin, GEC-716, gives full particulars. Secure a copy from the nearest G-E Apparatus Sales Office, or write Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

NOVEMBER 1950

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-third year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
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Cover photo: San Francisco's first postwar Electrical Wonderland Exposition drew 114,784 attendance in nine days.

NEXT MONTH

Microwave for utility communications is very much in the limelight on the West Coast. Again we will have one or more articles. These will deal with principles, experience, costs, and factors affecting choice between wire, carrier and microwave, rather than a specific application. There will be another article on dispatchers' boards—this one dealing with a new steel board in Portland on which Alnico magnets are used. This is the first of this type board in the West.

A most interesting article will describe the new analogue computing center at the University of California at Los Angeles. These machines will solve problems in calculus too complex or incapable of mathematical solution. Importance to the industry will be stressed.

In lighting and wiring there will be a picture-story on the new Zellerbach office and warehouse at Sacramento as a fine example of industrial lighting and low-voltage control. New offices and warehouses of Graybar in Los Angeles and G-E Supply Co. in Oakland will be given a picture treatment to show modern facilities provided for material handling and lighting installations that can be used by contractors to sell good lighting jobs.

Data sheets, news letters and coverage of association meetings will round out the issue.

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Get Real overload protection

with L-M ROUND-WOUND CSP Transformers

L-M Round-Wound CSP's undergo thorough and complete testing during and after assembly. They are available in sizes from 3 to 50 kva, 2400 to 14,400 volts. They provide complete protection against lightning surges, overloads and burnouts, and system faults.

● For 14 years utility men have enjoyed the *dual* protection given by L-M's Completely Self-Protected Round-Wound distribution transformers:

Protection for the transformer and the system, by the CSP features—expulsion lightning arresters, primary fuses, and secondary breaker . . .

Extra protection through the thermal characteristics of the Round-Wound design, which provides exceptional high short-time overload capacity.

Arresters, fuses, and breaker protect the *transformer* itself against lightning surges and overloads, and protect the *system* against faults in case of winding failure. The breaker operates on both overloads and temperature rise, disconnecting the load whenever it reaches an unsafe level. In case of secondary short circuits or exceptionally heavy overloads the breaker quickly interrupts the secondary service. Breaker operating handle, with built-in signal light in larger sizes, permits convenient and safe resetting of the breaker—and the usual complete protection is continued. Included is a simple control for use in emergencies to provide that extra overload capacity inherent in the Round-Wound transformer.

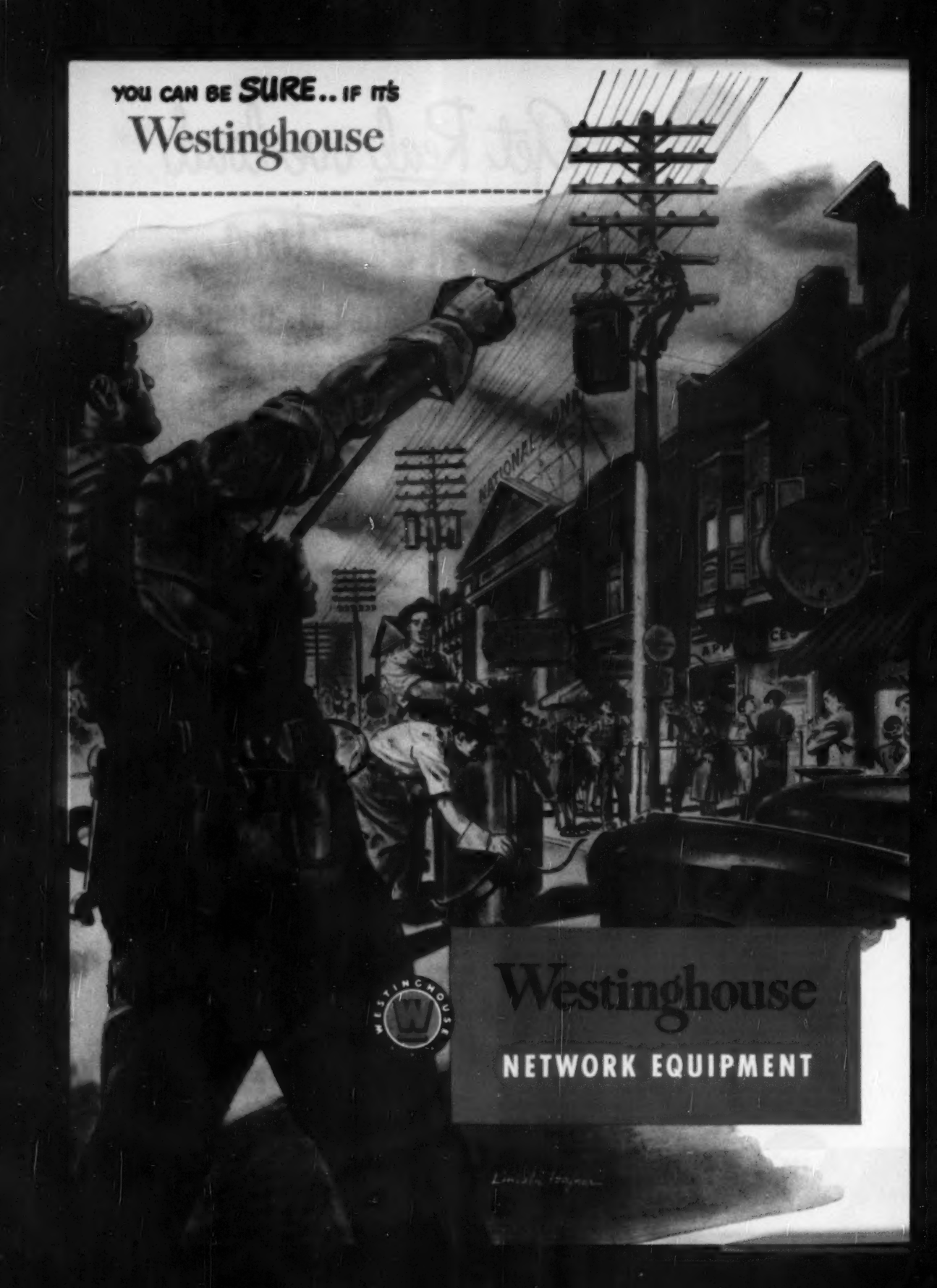
Round-Wound's Extra Safety Margin. Under overload conditions, L-M Round-Wound transformers offer a *real* advantage. They have an inherently low gradient between "hot-spot" and top oil temperature. *Long round* coils have large cooling surfaces; *oil ducts* within the windings and between coils and the cruciform-shaped core provide a tremendous cooling capacity. These all contribute to exceptionally low copper temperatures *even* under overload conditions.

Get the whole story

Construction, features, dimensions, and application information on L-M CSP's are available in Bulletin DT3. Ask the L-M Field Engineer for a copy or write Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

LM

LINE MATERIAL... Transformers


YOU CAN BE SURE.. IF IT'S
Westinghouse
Westinghouse
NETWORK EQUIPMENT

When the Poles Get "Top-Heavy"..

SECONDARY NETWORKS PAY!

As you plan system improvements, examine the smaller load-density areas . . . where the load is growing *fast* . . . where demand necessitates frequent additions to distribution facilities. Then ask yourself this question:

Will the maintenance of satisfactory service in these areas eventually lead to an expensive, over-congested condition . . . to "top-heavy" poles?

If the answer is "yes" . . . ***it's time for a secondary network!***

The high quality of service provided by the secondary network system is just as essential to the electrical growth of the smaller commercial district as it is to the sprawling business sections of the big city. What's more, it gives you the flexibility to accommodate extensions, load shifts and future growth *economically*. It permits healthy cuts in operating and maintenance expense that add up to substantial, long-term savings . . . that spell *economy* in the final accounting.

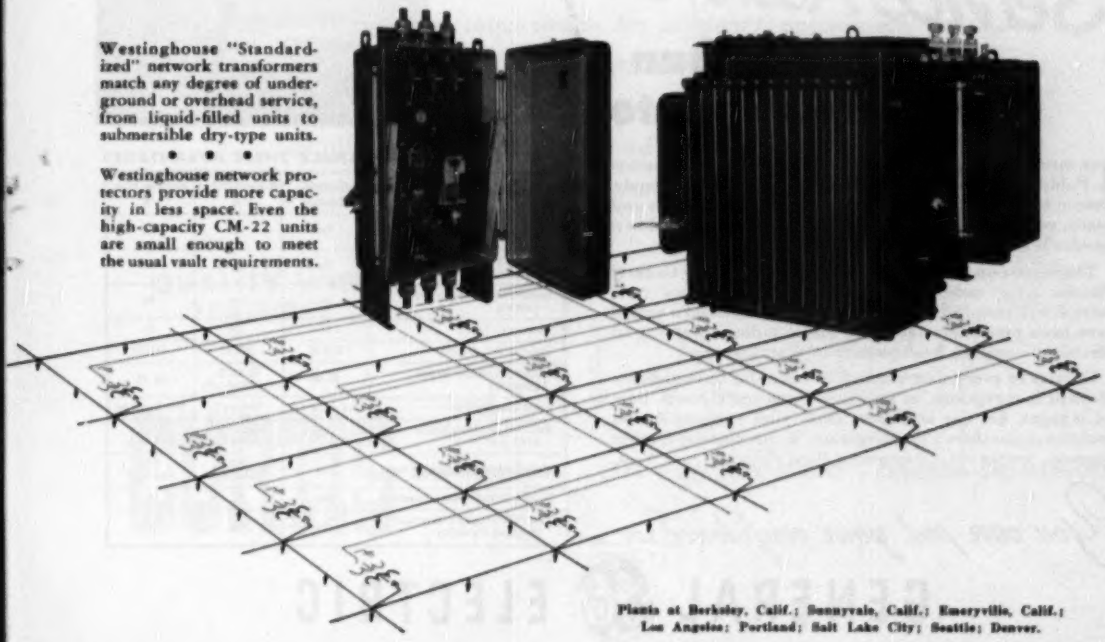
A quarter-century ago, Westinghouse introduced the first three-phase, automatic network protector. Continuous pioneering in this field has led to such present-day developments as the first submersible, dry-type transformers. This long experience . . . our competent facilities, engineers and calculating boards...are available to help you with *your* network planning. Call your nearest Westinghouse office or write for Booklet B-4002, "A-C Secondary Network Systems".

Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-97145

Westinghouse "Standardized" network transformers match any degree of underground or overhead service, from liquid-filled units to submersible dry-type units.

• • •

Westinghouse network protectors provide more capacity in less space. Even the high-capacity CM-22 units are small enough to meet the usual vault requirements.



Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

Service Restored

faster than ever after ice storm . . .

ICE storms are a utility's nightmare. Recently, the Missouri Public Service Corporation had a beauty on its hands. Driven by high velocity winds, heavy sleet lashed trees and roads, coated them with 6 to 8 inches of ice, pulled down hundreds of miles of line in the 17-county service area.

Thanks to *instant communication* made possible by General Electric 2-way radio in line trucks and supervisors' cars, service was restored at least 3 to 4 days earlier than would have been possible without the use of radio, according to officials at company headquarters in Warrensburg.

Utilities in every state use G-E 2-way radio to coordinate planned interruptions, to save manhours, truck hours, time on outages. Let our engineers study your communication problem, too—there's no obligation. Write: *General Electric Company, Section 22110 Electronics Park, Syracuse, New York.*

YOU BE THE JUDGE—CHECK THESE ADVANTAGES

Equipment Features	General Electric	Manufacturer A	Manufacturer B
Triple-Tuned Transformers (high selectivity with fewer tubes)	Yes	No	No
At Least 7 Watts Peak Audio Output	Yes	No	No
Instantaneous Modulation Limiting	Yes	Yes	No
Number of Tubes	18	26	22
Cost per Set of Tubes	$24.50	$50.16	$31.79
Spurious Radiation at any frequency	65 db	60 db in the band only	60 db
Cable Junction Box	Not Required	Required	Not Required
Key Lock for Protection of Every Unit	Yes	Optional at Extra Cost	Not Available
Microphone Quick Release Plug	Yes	Not Available	Not Available
20 kc & 40 kc Receiver Selectivity	Yes	No	No
Two-Unit Design for Maximum Mounting Flexibility	Yes	No	No

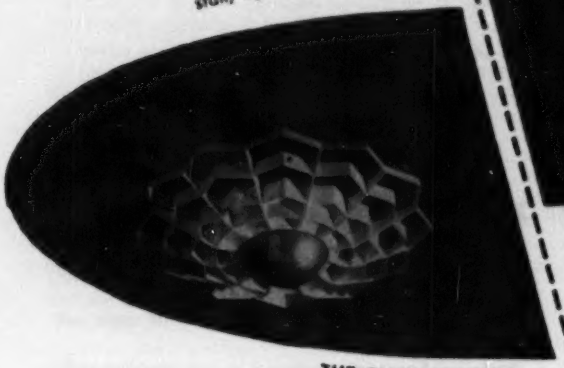
You can put your confidence in—

GENERAL ELECTRIC

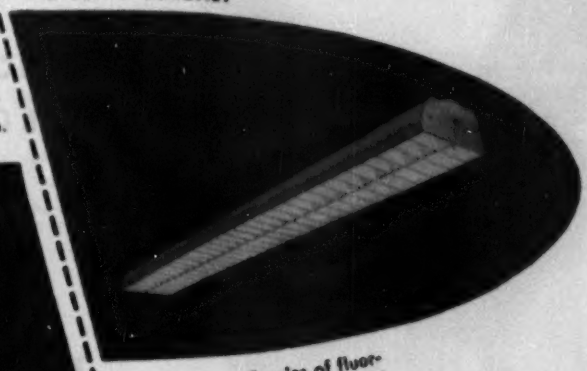
fluorescent or incandescent

THE CURTIS CORONET

Curtis Sno-Flake for one 300 or 500 watt Mogul base silvered bowl lamp is highly efficient, economical to install, operate and maintain.



THE CURTIS SNO-FLAKE



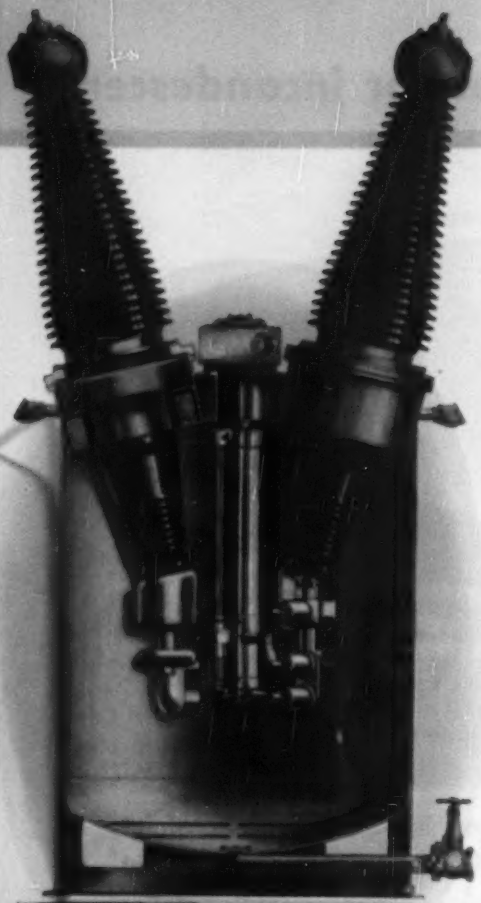
Curtis "Coronet" series of fluorescent luminaires is designed and engineered to accomodate all 4, 5, 6 and 8-foot lamps . . . slimline . . . low-brightness or starter type.

Whether a fluorescent or incandescent light source is required for your next lighting installation, there is a Curtis quality luminaire that will meet exact requirements for efficiency, appearance, installation and maintenance. The "Coronet" and "Sno-Flake" are two new Curtis developments designed and engineered to provide quality illumination for all commercial interiors and the modern classroom. Write for descriptive illustrated bulletins.

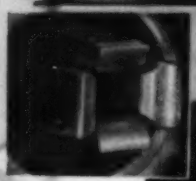
QUALITY WITH FEATURES

CURTIS LIGHTING, INC. • 6135 WEST 65th STREET • CHICAGO 38, ILLINOIS

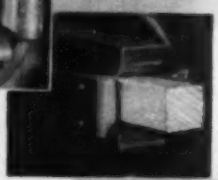
. . . . for Improved High-Voltage Switching



Above:
Sectional Elevation
196/230-kv Rating.



At left:
OPEN.



At right:
CLOSED.

Above:
Sliding-Shoe Nested Contacts (with Interrupters Removed).

At right:
Interrupters and Blades (one side only).

PACIFIC ELECTRIC TYPE RHE OIL CIRCUIT BREAKERS *for*

REDUCED MAINTENANCE
IMPROVED RELIABILITY

Verify the worth of each of these listed features in the light of your own experience

Only One Moving Element in the Tank

Moving as one piece, the rotary blade-structure provides six equal-length gaps in series per pole, totaling 80 to 96 inches, according to rating.

All gaps open at equal speed throughout entire stroke, and open fully before reclosing starts.

The rotary form permits adequate blade acceleration without need of auxiliary levers or multiplying linkage in the contact housings for increasing initial speed.

Nested Sliding-Shoe Contacts

No sensitive adjustments required to fix closed position.

Arcing does not affect surface carrying load current.

Wiping action smooths and cleans surfaces.

Leaf springs apply adequate pressure regardless of wear of the shoes; eliminates need of pressure adjustment.

As moving contacts do not charge auxiliary springs nor drive contact linkage, impact on bushings and battering of stationary contact shoes is negligible.

Improved Interrupters

Oil blast interrupters confine thermal effects within the interrupting chambers. Oil is not directed into or alongside of arc path; however, relatively cool oil vapor rapidly replaces ionized portions. The usual large gas bubble does not form, with the result that ground shock and jar caused by oil displacement within the tank is eliminated.

Oil-gas separators are thereby rendered unnecessary, so are not used.

PACIFIC ELECTRIC
5815 THIRD ST., SAN FRANCISCO 24, CALIF.

PACIFIC "RHE" Oil Circuit Breakers

3-Cycle Interrupting; 10-Cycle Closing;
15- to 45-Cycle Adjustable Reclosing
115, 138, 161, 196/230, and 230 Kv
Continuous Rating, 800 and 1200 Amp
Interrupting Rating to 10,000,000 Kva at 230 Kv

Many of America's leading power systems have installed these circuit breakers, or have them on order.

Design interrupting tests up to 9,620,000 kva were conducted on prototype circuit breakers at the Grand Coulee Switchyard in June, 1948.

Oil-Hydraulic Compressed Operating Springs

The compressed operating springs stand ready for action —for years, if necessary—without anything meanwhile having to move or operate.

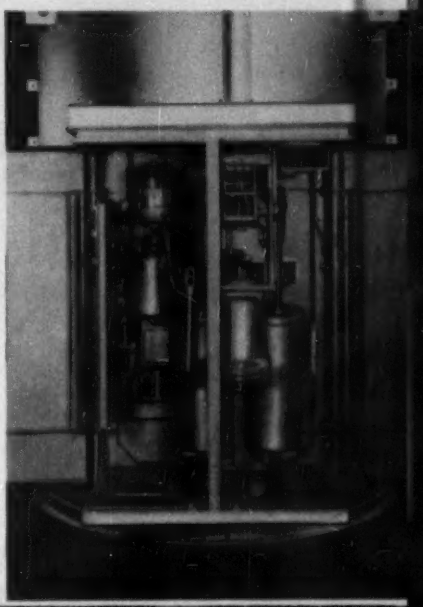
Operating-spring compression is by motor-operated oil-hydraulic jack which is under pressure only during compression of the springs.

Motor-Operated Main Mechanism

The opening and closing latches, the closing-energy system, oil-hydraulic decelerators, control circuits, and auxiliary switches are housed in dust-proof cabinet mounted on No. 1 pole. All operating forces are self-contained within compression tubes that surround pull rod and connect main and tank-top mechanism housings.

The velocity of any mechanism part (aside from the opening latch) does not exceed 8 ft. per sec. (the speed of a body falling one foot). Impact is thereby eliminated as a problem.

The mechanism is electrically and mechanically trip-free.



Main Operating Mechanism with doors open. Shows oil-hydraulic cylinder centered between double closing-spring barrels.

Opening Forces Externally at Tank Tops

Each pole has individual external kick-off springs that apply opening force directly to the crank arm of the rotating unit. For ease of inspection, all opening toggle linkage is also outside of the tank. A follow spring at end of pull rod on No. 3 pole completes the opening stroke that was started by the tank-top kick-off springs.

Emergency Manual Operation

Should control power fail, manual latch tripping provides a close-open or open-close-open sequence as necessary. If power remains off, two minutes operation of hand oil pump restores full operating energy.

Below: Two 196/230-kv Type RHE's on the line.

Advanced Design

Integral assemblies and multiple functioning of parts greatly simplify and reduce number of parts and adjustment points. Mechanical linkage interlocking eliminates need for an anti-pumping relay, and it permits reduction of the number of position-check switches to only one.

MFG. CORPORATION
P. O. BOX 419, GARY, INDIANA

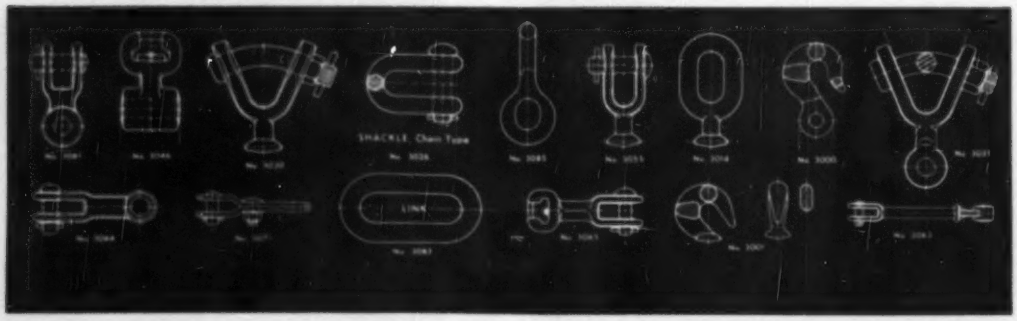
STANDARD *Drop Forged* STEEL FITTINGS

Aside from Conductor and Ground Wire Clamps and Strain Yoke Sets, a *complete line* of transmission hardware *must* include a considerable number of standard, quickly-available accessory fittings, designed for all classes of service, for use with ball socket or clevis type insulators in all standard M & E Strength Ratings. Some fittings are used in large quantities—others in small lots. Invariably some of each class are needed to fill any transmission line bill of materials.

Over 100 catalogued Drop Forged Steel Fittings comprise the BTC *complete line.* Many of the items are furnished in various eye widths, hole sizes, connecting lengths and strength ratings. Numerous other special purpose fittings—for which dies and tools are available—can be supplied on special order.

Specify BTC Fittings with BTC Clamps and Strain Yoke Sets to insure careful design, trouble-free installation and long service life.

Sold through your insulator manufacturer only.



SPIRAKORE®
TRANSFORMERS

Sealed to live longer

Every opening in every General Electric Spirakore® transformer is sealed with a Nitrile* rubber gasket.

Sealing is so complete that *breathing is stopped.* Hottest summers and coldest winters won't draw moisture or dust into the tank. Life of transformers is prolonged.

With this sealing, *accessibility is actually improved.* Unclamp the tank cover, and it lifts right off. No adhesives to break. No surfaces to clean before resealing. You even re-use the gasket.

This better sealing is only one of the reasons why we say: Today's Spirakore still leads the field—the finest distribution transformer we've ever made—the finest you can buy.

*Nitrile rubber gaskets—first introduced in transformers as a result of work by the G-E Pittsfield laboratory (in 1941)—resist oil, age, sunlight and operating temperature.

Apparatus Department, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

"The immunizer against the disease of communism is a certain feeling . . ."

MR. WALTER S. GIFFORD

"It is the feeling of a man who owns a home, a bank account, an insurance policy. *It is the feeling that an employee on the Payroll Savings Plan has when he gazes at his accumulation of Savings Bonds and realizes that here is palpable evidence that he has made a profit on his job—that the profit system works for him as well as for his employer.*"

Mr. Gifford has believed in—and worked for—payroll savings plans for thirty-seven years—since 1913, when, as Statistician of the A. T. & T., Mr. Gifford developed a payroll savings plan for the purchase of A. T. & T. stock.

In 1938, A. T. & T. employees were offered a Payroll Savings Plan for the purchase of U. S. Savings Bonds. To date, Bell System employees have invested ***more than half a billion*** dollars in savings bonds—with a maturity value in excess of $675,000,000.

In upwards of 21,000 large companies, more than 8 million Americans are investing $150,000,000 in U. S. Savings Bonds ***every month.*** To the systematic saving of these men and women—and the whole-hearted co-operation of executives like Mr. Gifford—is due in no small measure the important feeling of ownership shared by the Americans who own 56 billion dollars in U. S. Savings Bonds (against 45 billions at the end of the war!).

Every Payroll Savings Plan is a reflection of the vision and enthusiasm of the top executive of the company. If he gets behind it, ***personally,*** employee participation is high—to the benefit of the country, the company and the employee. If the interest of the Big Boss is active—participation may very well exceed the 50% mark. The top man is the key man in a Payroll Savings Plan.

Get in touch with your State Director, Savings Bond Division, U. S. Treasury Department. He will help you put in a plan . . . or he will show you how to increase employee participation—without undue effort or high pressure tactics.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the G. M. Basford Company and

ELECTRICAL WEST

Built to Cut Maintenance

EASIER MAINTENANCE PROCEDURES and lower maintenance costs are important features of this brand new line of large motors. One man can perform all routine maintenance procedures, including opening up the motor for cleaning. Bearing surfaces are not exposed to abrasive grit and dirt during cleaning operations.

The appearance of this new line of large motors reflects the advanced design and fine workmanship that goes into their manufacture.

A well-braced, sturdy fabricated steel frame with cast-iron end brackets rigidly support and protect working parts. Ventilating openings are large to provide adequate cooling air at low velocities with resultant low sound level.

Wide Range of Sizes

These new design Allis-Chalmers drip-proof and splash-proof squirrel-cage induction motors are built in sizes from 60 hp at 300 rpm to 1500 hp at 1800 rpm. Ask your Allis-Chalmers representative to show you the details of this exceptional new motor or write for Bulletin 05R7542.

How's This for Accessibility

One man can remove the end brackets and air baffles and reach right inside motor with his vacuum cleaner or air hose. Bearing remains sealed against abrasive dirt throughout the cleaning operation.

Large air discharge openings with removable louvers allow plenty of room to get in with an electric drill for doweling and bolting the motor to the base. Plenty of room to reach up back of the stator core for cleaning.

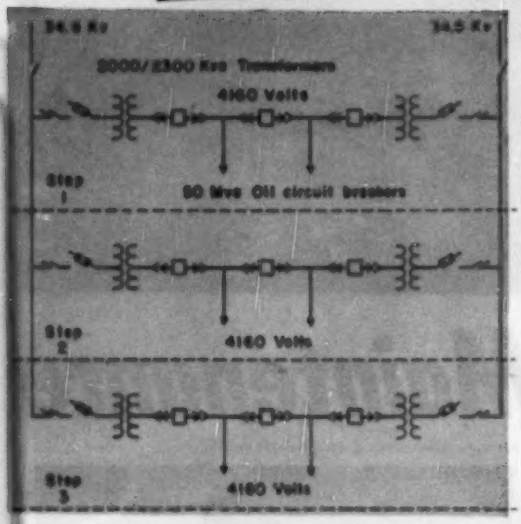
A-3179

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

UNIT SUBSTATION

LAYOUT WITH G-E SUBSTATIONS



STEP 1	GE Duplex Unit Substation and structure (including landscaping)	$57,000
	Installation	13,000
STEP 2	GE Duplex Unit Substation and structure plus installation	62,000
STEP 3	(Same as Step 2)	62,000
	Total cost	$196,000

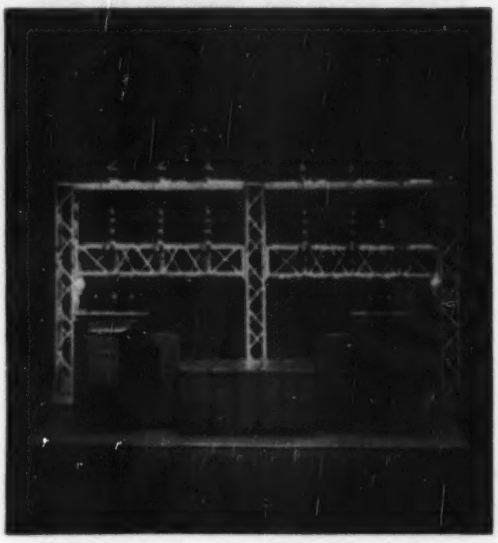
Note how the one-line diagram at the left, using General Electric Duplex Unit Substations, duplicates in every respect the electrical functions of the proposed piecemeal arrangement—at a savings of $84,000, or 30%. Individual feeder voltage regulation is economically obtained by load-ratio-control transformers, since each transformer normally serves only one feeder. The compact construction of the G-E substation made landscaping easy—and inexpensive.

General Electric Unit Substations give further savings by deferring investment costs and by allowing expansion to take place logically and when needed, and without the obsolescence of breakers. Also, the small units allow the use of breakers of relatively low interrupting rating.

When you order General Electric Unit Substations your engineering involves only a simple one-line diagram like the one above. We do all the detailed specs, prepare construction drawings, electrical diagrams, operating instructions and other paper work to give complete co-ordination of the project—all this on one purchase order, and at lower costs than piecemeal, field-assembled types.

For further information ask your G-E Sales Representative for the publications listed or write to *Apparatus Department, General Electric Company, Schenectady 5, N.Y.*

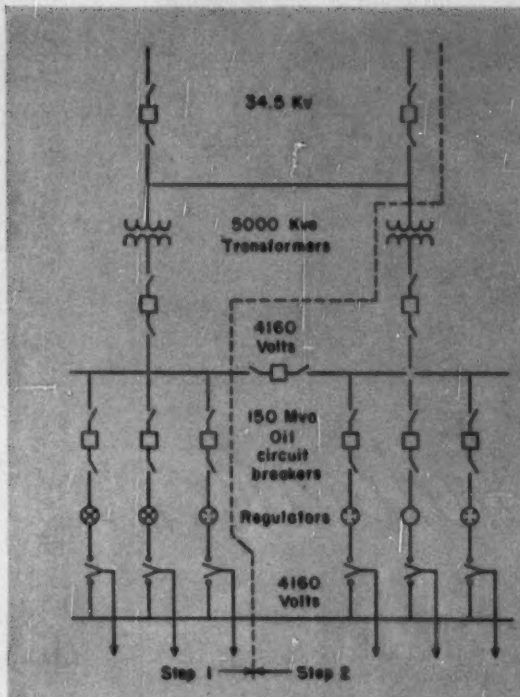
Master Unit Substations	GEA-3800
Single-circuit Unit Substations	GEA-4300
Package Substations	GEA-4500
Rural Package Substations	GEA-3276



Here's a view of a G-E Duplex Unit Substation similar to the ones in the layout above.

LAYOUT SAVES 30%

PROPOSED PIECEMEAL ARRANGEMENT



STEP 1	Three feeders and proportionate cost of brick building*	$190,000
STEP 2	Three feeders and remaining cost of brick building	190,000
	Total cost	$380,000

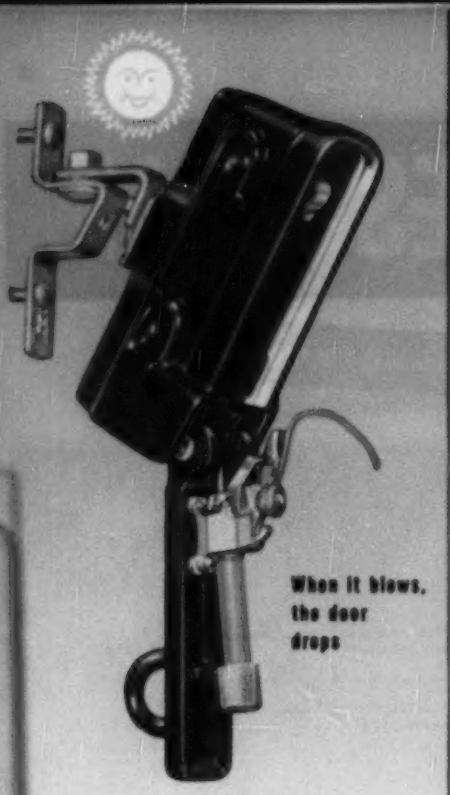
*Transformers and 34.5 kv breakers to be located outside behind ornamental brick building housing remainder of switchgear, regulators, etc.

This proposed piecemeal arrangement is of the spot network type. It is based on a typical installation using 1950 cost figures. Accurate feeder voltage control can be provided by separate voltage regulators on each feeder in conjunction with a regulator transfer bus.

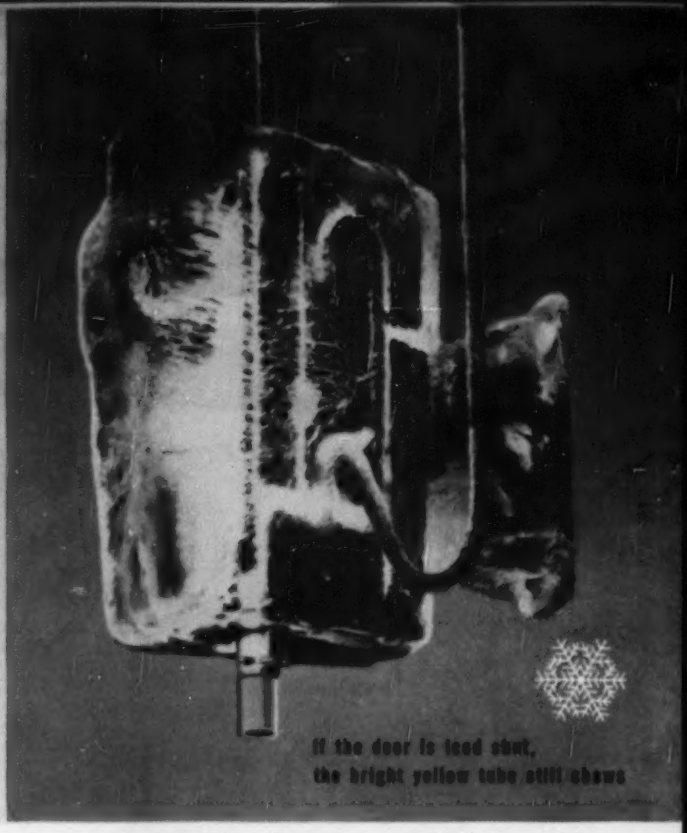
To see how the G-E Duplex Unit Substation layout did the same job—at a savings of $84,000, or 30%—over the above arrangement, look at the layout on the opposite page.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and 9-tee Offices in twenty Western cities.



When it blows, the door drops



If the door is iced shut, the bright yellow tube still shows

You get *Dual Indication*

with L-M's PVD 561 the all-weather cutout

In summer or winter, sunshine or sleet, you can count on the DUAL INDICATION of the PVD 561. When the fuse blows, the flip-out device rapidly withdraws and ejects the blown link. Upper contact spring pushes the tube down, releasing the door, which is then forced out by pressure of the lower contact spring. Works like a charm!

If the door should be iced shut, the tube still drops. Its bright yellow plastic is a vivid indication to the lineman that he'd better do something about it.

Operation assures positive disconnect—there are no live parts on the door, which is easily unhooked for re-fusing. High-grade wet-process porcelain housing. Heavy copper contacts with silver-plated surfaces. Positive contacts and substantial current-carrying parts assure low operating temperatures. Non-ferrous parts eliminate danger of corrosion. Instant, smooth operation.

Two ratings: PVD-561, 5000 V, 50 amps; PVD-761, 7500 V, 50 amps. Both have rated interrupting capacities of 1200 amps. Door and cartridge assemblies interchangeable with the PVD-56 and 76. By carrying a spare fused door the lineman can re-fuse either type in 60 seconds or less.

Easy Way to Get Details

Ask the L-M Field Engineer for Bulletin FC2 or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

1

LINE MATERIAL Fuse Cutouts and Fuse Links

Complete Coordinated Equipment for Distribution Today

FOR ECONOMICAL RURAL PROTECTION TODAY

LM's Combination Arrester and Cutout

Saves 20%

Two well-known L-M products have been combined to create the Combination Lightning Arrester and Fuse Cutout—the 9 kv "PF-3" Expulsion Arrester and the 7.5 kv Open-Link "STF" Cutout.

This combination is designed to provide complete low-cost transformer protection on rural lines rated at 7200/12470 and 7620/13200 volts grounded wye.

This unit-combination costs 20% less than the same size arrester and cutout ordered separately. Installation costs, too, are lower, since it is necessary to mount only one, rather than two, units.

The PF-3 arrester has a rated discharge capacity of 65,000 amps, meets all AIEE and NEMA standards. The cutout has a continuous current carrying capacity of 50 amps and 600-amp interrupting capacity. The fusible link is contained in an arc-extinguishing sleeve which confines the arc, assuring successful clearing of a fault. Constant tension on the link assures rapid separation of link parts with no possibility of re-establishing the arc.

Re-fusing is easy and safe. With hot stick in fuse link top loop, the lower end of the link is hooked into the lower contact. The top end of the link is then pulled up and seated in the upper contact.

This combination is REA-accepted.

For details ask the L-M Field Engineer, or write Line Material Company, Milwaukee 1, Wis. (A McGraw Electric Company Division).

LM LINE MATERIAL... Protective Equipment

Complete Coordinated Equipment for Distribution Today

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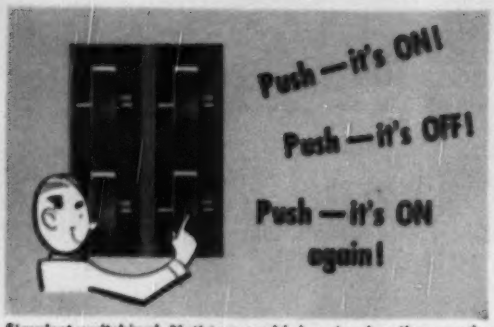
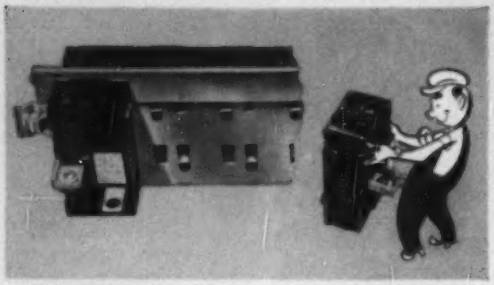


Simplest switching! Nothing could be simpler than push-button switching! Push of the finger switches current either ON or OFF. When Pushmatic is automatically tripped by short or overload, just push the button and service is restored. No bothersome resetting . . . no fuses to buy.



Most flexibility! Compact Pushmatics are identical in size and contour, regardless of rating or type. Each unit can be quickly, easily inserted or removed from an Electri-Center without disturbing other units. Pushmatics may also be quickly interchanged any time to meet changing electrical requirements, still retaining the neat, symmetrical appearance of original installation.

4 ways better for circuit control and protection!

Pushmatic® Electri-Centers

Homes Buildings Factories

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Surest protection! Pushmatics operate with split-second precision when overload or short occurs. Automatic tripping is entirely independent of manual operation. For installations subject to unusual temperature variables, Ambient Compensated Pushmatics carry 100% of their rating at any ambient temperature between 30°F. and 150°F.

Finest styling! Attractive, compact Pushmatic Electri-Centers can be installed almost anywhere to give your clients convenience never possible with old-fashioned panelboards. Revolutionary Pushmatics, smaller than a pack of cigarettes, make Electri-Centers more compact for real space saving and attractiveness. Gray enamel finish, standard on all Electri-Centers, harmonizes with any color scheme.

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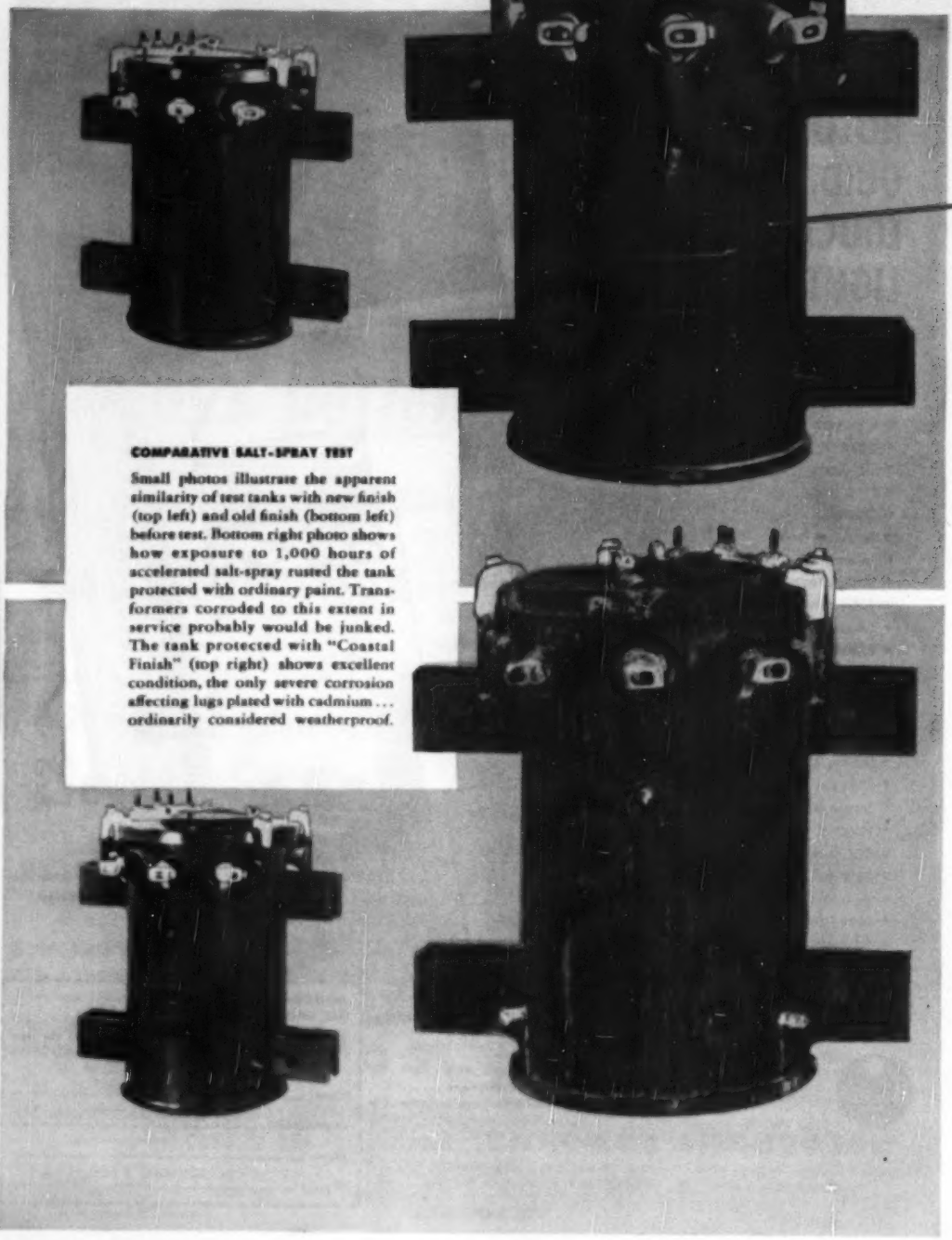

COMPARATIVE SALT-SPRAY TEST

Small photos illustrate the apparent similarity of test tanks with new finish (top left) and old finish (bottom left) before test. Bottom right photo shows how exposure to 1,000 hours of accelerated salt-spray rusted the tank protected with ordinary paint. Transformers corroded to this extent in service probably would be junked. The tank protected with "Coastal Finish" (top right) shows excellent condition, the only severe corrosion affecting lugs plated with cadmium ... ordinarily considered weatherproof.

—NEW "COASTAL FINISH"

New finish for Pole-Type Transformers adds years of protection under all service conditions

Greater resistance to chalking, cracking and rust! More than doubles the protective life of the finish! Adds years of service before repairing and repainting!

A new and better finish, developed in Westinghouse laboratories specifically to meet severe conditions of blistering heat, icy cold, rain, snow, salt and other corrosive atmospheres, *"Coastal Finish"* is now provided on all Westinghouse Distribution Transformers, "CSP"® and conventional.

"Coastal Finish" consists of a primer coat to inhibit rust, an intermediate coat containing mica flakes that overlap like shingles on a roof to provide superior moisture resistance, and a final gloss coat that improves appearance, and filters out ultra-violet sun rays. Infra-red baking assures complete hardening of each paint film.

Comparative weathering tests . . . salt-spray, acid and alkali resistance, and weather-o-meter . . . clearly show the advantage of *"Coastal Finish"* in all types of atmospheres. This is *another plus value* in Westinghouse Distribution Transformers. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

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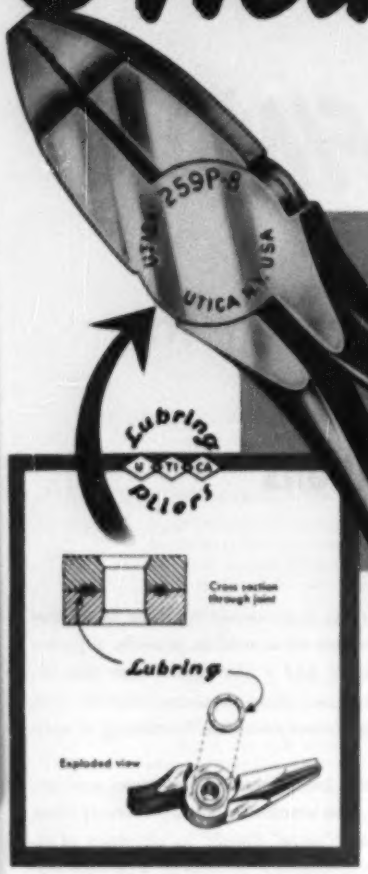

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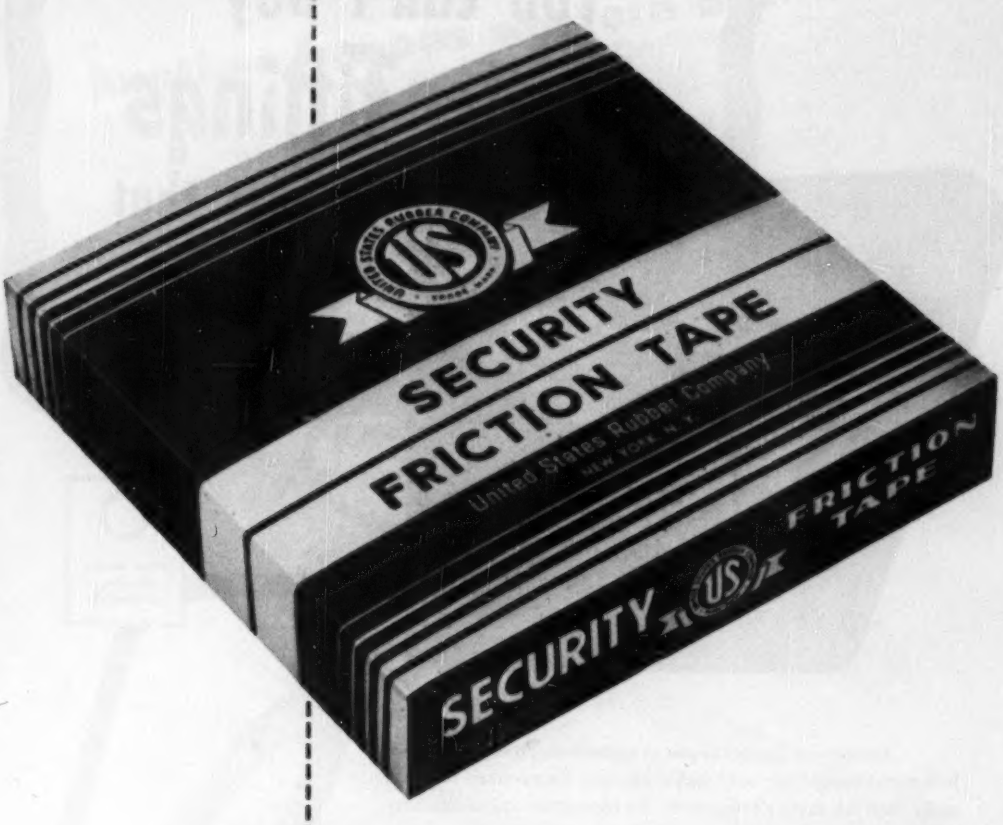

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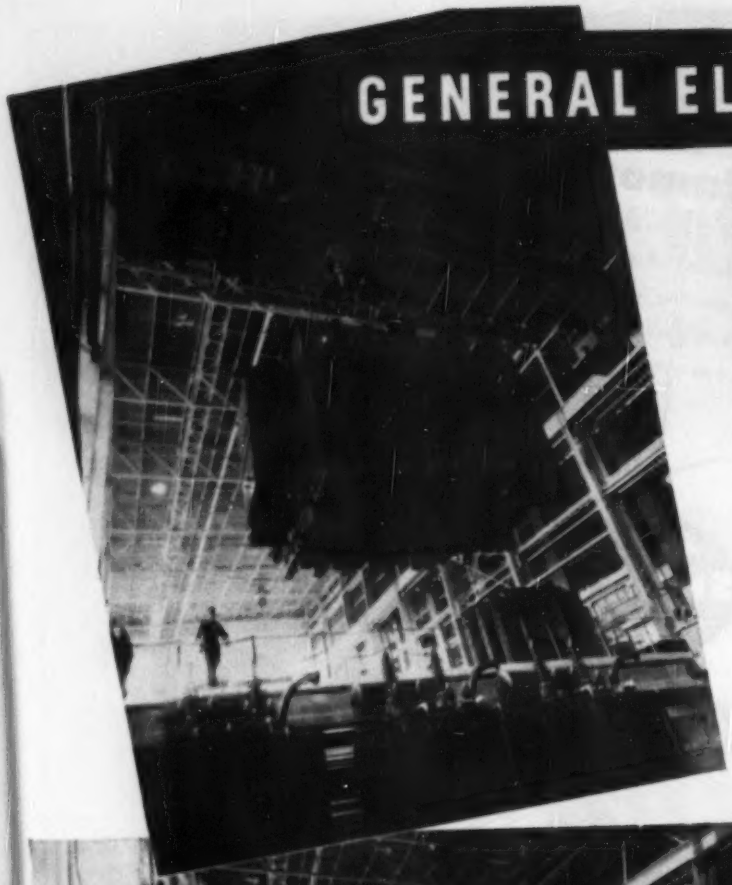

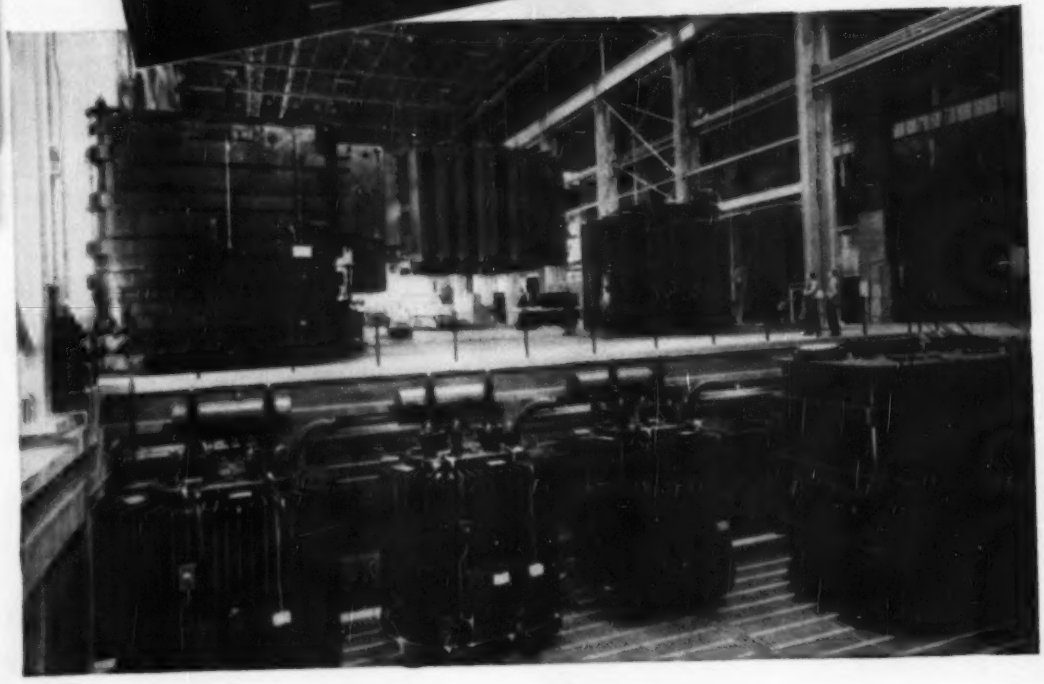

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With these new manufacturing and commercial testing facilities, we are now ready to build transformers with a B.I.L.* of 1,550 kv, corresponding to operating voltages far exceeding any in use today. We have already built a 360,000-volt power transformer which we thoroughly tested, disassembled, rebuilt and completely retested, to verify design data. This transformer has a B.I.L. of 1,550 kv full-wave and 1,785 kv chopped wave. It successfully withstood repeated impulse tests at both of these values, which we believe to be the highest ever attained on a complete transformer.

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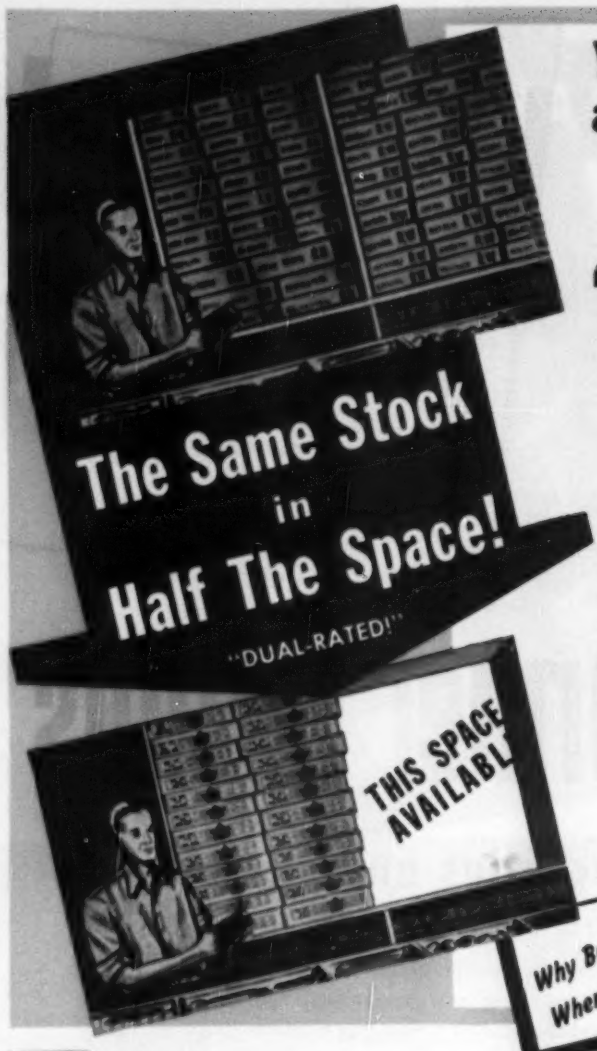

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Use "Dual-Rated"! It's a remarkable wire. Available in sizes #14—1,000,000 CM. In sizes #14 through #6, the cover is Triangle's revolutionary Glazon—the toughest, easiest-to-work cover on the market.

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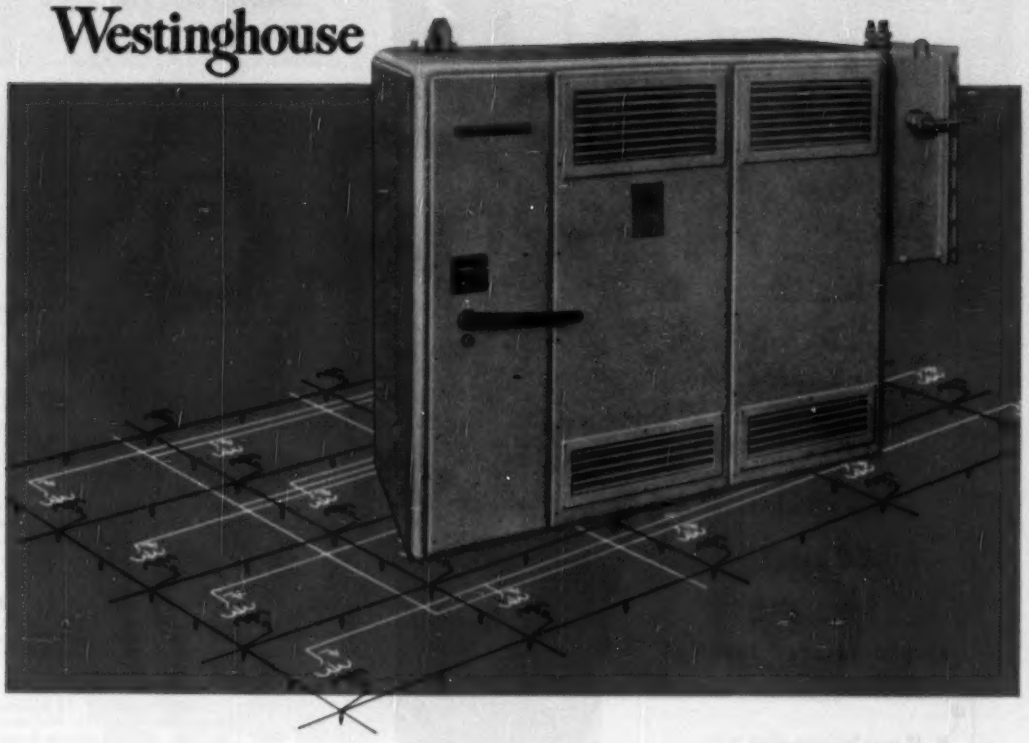

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Safe and clean, the Westinghouse Ventilated Dry-Type "ASL" Transformer approaches perfection for indoor network service. Air-cooled, it has no liquids to filter or maintain. It is the most economical indoor transformer to install, because it meets Underwriters' code requirements without a vault.

No matter what type of network system you plan, or what your installation problems may be, Westinghouse can help you keep costs down . . . now . . . and in the future.

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Ask your Westinghouse representative for further information, or write for Booklets B-4028 and B-4002-A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70560

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ELECTRICAL BOOKS

ELECTRICITY IN THE HOME AND ON THE FARM, 3d edition, by Forrest B. Wright, 380 pages, 6x9, John Wiley & Sons, $3.96. Provides basic information about electricity for a thorough understanding of ordinary applications, plus directions for installing, servicing and repairing electrical equipment used on the farm. In this third edition much of the elementary material of previous editions has been omitted and in its place has been included more advanced information. Material on low-voltage wiring and equipment has been replaced by more information on alternating current, standard voltage equipment and a-c motors.

THE INTEGRATED POWER SYSTEM, by Philip Sporn, 156 pages, 6x9, McGraw-Hill Book Co., $4. The book is intended to present the basic principles, the components, the economic advantages, disadvantages and limitations of the integrated power system as the basic mechanism for power supply. No attempt has been made to enter into detailed technical discussions of any of the phases related. Rather, stress has been laid on developing the over-all significance and relationship of the multitude of technical developments and their coordinated utilization to give an over-all optimum result. The material is of interest to technical students, power system executives and engineers, economists, investment bankers, legislators and administrators.

INDUSTRIAL ELECTROCHEMISTRY, 2d edition, by C. L. Mantell, 656 pages, 6x9, McGraw-Hill Book Co., $8.50. One of sixteen books in the McGraw-Hill chemical engineering series. A treatise on the industrial and engineering phases of electrochemical processes. The book endeavors to point out and emphasize the technological importance of electrochemical processes, to stress their practical aspects, and to adopt the engineering viewpoint. The second edition contains some rearrangement of topics with the inclusion of new subject matter resulting from electrochemical development. The book is intended as a text in chemical engineering courses and as a reference work for industry in general.

INDUSTRIAL HIGH-FREQUENCY ELECTRIC POWER, by E. May, 355 pages, 6x9, John Wiley & Sons, $5. The book serves as an excellent introduction to those interested in applying high-frequency heating to industrial problems. From basic circuit theory to operating problems it provides a concise summation of basic facts in this growing field. It is well suited to give inexperienced people in industry a source of the basic facts and instruction on how to attack specific heating problems. The book constitutes a well-organized presentation of the basic facts used in the application of electricity and electronics to induction and dielectric heating.

RADIO COMMUNICATION AT ULTRA-HIGH FREQUENCY, by John Thomson, 203 pages, 6x9, John Wiley & Sons, $4.50. Principles and equipment for use specifically in radio work are drawn together. Theoretical and practical advances are presented that point the way toward great improvements in U.H.F. communication. Recent discoveries are thoroughly treated, stressing advances that can be adapted to radio use.

Modern Meters for modern switchboards

Sangamo Switchboard Meters have service type elements.

The complete, service-proved line of Sangamo Watthour Meters is now available for semi-flush mounting on modern switchboards.

Type LCF meters, for polyphase circuits, and Type JF meters, for single-phase circuits, are built in all current and voltage ratings for which standard service type watthour meters are made —all require the same minimum switchboard area. These meters are offered with either kilowatthour registers or with registers measuring both kilowatthours and kilowatt demand. Type D5F, two-wire, direct current meters are also furnished in the new design.

Sangamo Meters for semi-flush mounting fit a 6⅜" x 6⅜" opening in the panel and mount with two screws. The cover can be easily removed to permit ready access to the various adjustments for full load, light load, power factor and element balance without removing the meter from the panel. All adjustments can be made from the front with a screwdriver. A micrometer slide-wire device is provided for making accurate power factor adjustments.

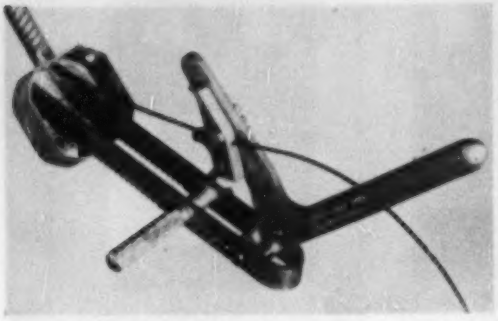
Bulletin No. 270 gives complete information. Write for your copy.

SANGAMO

SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

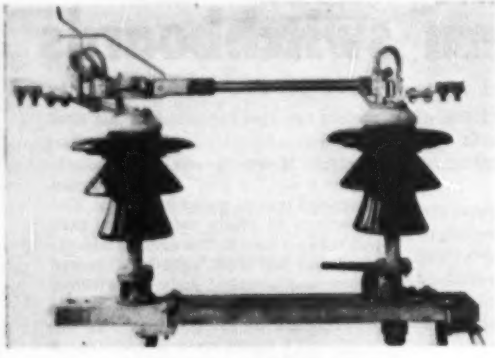
PRODUCT NEWS



Fishtape Puller

(1) Mallasch-Brandt Engineering Co., Dept. K, 1032 N. Orange Drive, Los Angeles 38.

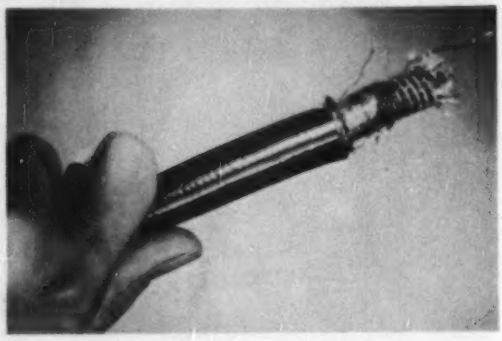
This fishtape puller combines the conventional hand puller with a detachable pressurized puller for more difficult jobs. This device pulls from top, sides and bottom and is readily adjusted to pull at any angle, with any desired length of stroke. The controlled, automatic gripping and releasing action during operation eliminates kinking or snapping out of fishtape, according to the manufacturer. The sawtooth-designed holding edge fits all standard outlet boxes, gutters, switches, etc., up to 8 in. It is made with a reversible hand grip to give either left- or right-hand operation.



High-Pressure, Side-Break Switch

(2) Southern States Equipment Co., Hampton, Ga.

A new-type high-pressure side-break switch, type 57-HP, replaces the SS type 57-A and is available in voltage ratings of 7.5 through 69 kv. and in current ratings of 400, 600 and 1,200 amp. The type 57 is a 2-insulator, single side-break disconnecting switch with one insulator rotating for operation. The blade is attached rigidly to the rotating insulator and is brought into position for contact engagement by rotation of the insulator. The jaw contact is a solid casting pivoted on the stationary insulator and biased to the open position with a stainless steel torsional spring to receive the blade contact. The blade contact engages the jaw, which then pivots with the blade into full contact engagement. Manual control or high-speed spring operator may be used. All parts are reversible so that switch can be changed from right to left hand operation in the field without additional parts.



Flexible Conduit

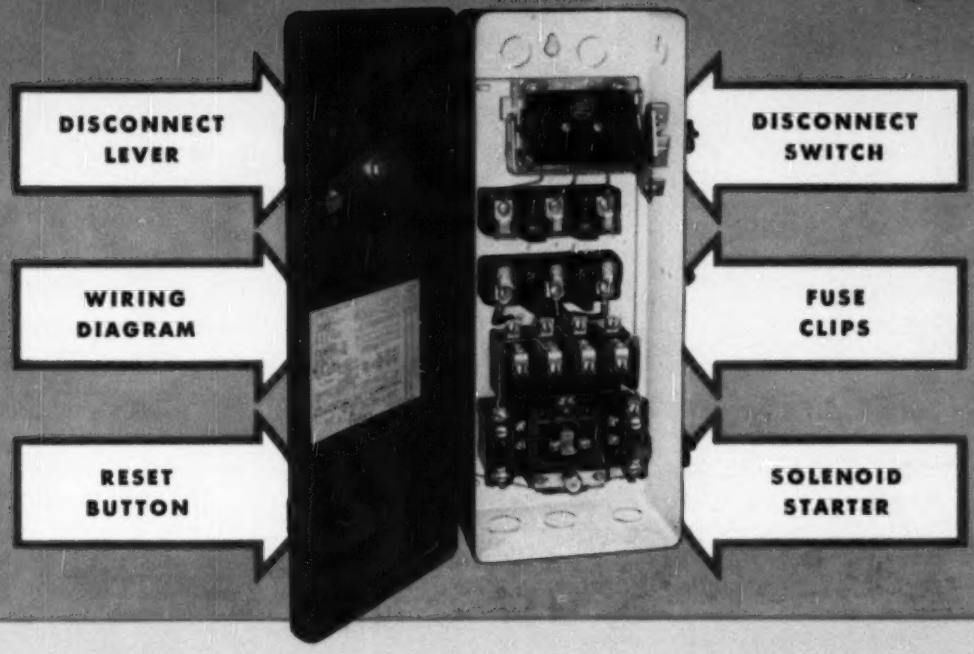
(3) National Electric Products Corp., 1308 Chamber of Commerce Bldg., Pittsburgh, Pa.

This new flexible electrical conduit consists of an inner woven tubing made of longitudinal Fiberglas yarns and a spiral wrapping of metal foil, with an outer braided jacket of aluminum wire. Conventional construction uses a spiral armor of interlocked aluminum strip over a braided aluminum wire jacket. According to the announcement, the new conduit uses less metal, is lighter, has greater flexibility, gives more uniform shielding and better resistance to damage from moisture, flame, oil spray and fungus. Invented by Elliott Solero, patent has been granted to the manufacturer.

Air Circuit Breakers

(4) Allis Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis.

Types G-25 and G-50 low-voltage air circuit breakers, previously available only as bare breakers or in metal-enclosed switchgear, can be had now for individual mounting. The individual, stationary mounted breaker has a sheet steel enclosure formed and welded into a housing that completely encloses the circuit breaker and cable connections. Said to be particularly effective where frequent operation is expected, the breakers are suitable for protection of lighting loads and small transformers, across-the-line starters, as back-up protection for motor starters and as main feeder breakers on systems that have a-c voltages of 600 and below, fault currents of 25,000 and 50,000 amp. and continuous currents from 35 to 1,600 amp.



Where Wiring Space Is "TIGHT"

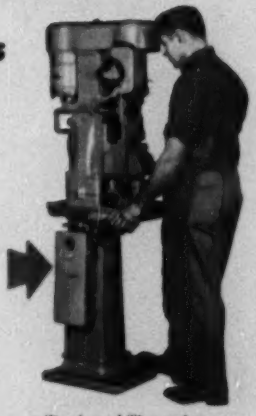
. . . use Bulletin 712 Combination Starters

Starter with lever locked in OFF position with three padlocks for safety to workmen.

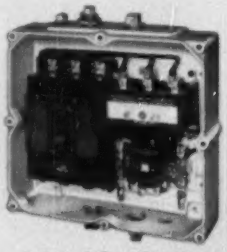
Compactness . . . that is a requirement of modern motor control. Do away with the old style disconnect switches and starters hanging all over your machines and factory interiors. Simplify your wiring jobs . . . make neater installations . . . with A-B combination starters that have all units—disconnect switch, fuses, and motor starter—in a single cabinet. There is greater safety, too. The interlocked disconnect lever must be in OFF position to open cabinet. Starter is then "dead."

Send for Bulletin 712-713 on A-B combination starters —with fused or nonfused disconnect switches, or with circuit breakers.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.



Kingsbury drilling and countersinking machine equipped with A-B combination starter.



Bulletin 713 combination starter with circuit breaker in watertight enclosure.

750-M

ALLEN-BRADLEY

QUALITY

BULLETIN 709 SOLENOID STARTERS

Why are they so tremendously popular?

The new Allen-Bradley Bulletin 709 Size 6 and Size 7 solenoid starter. Enclosed arc hood.

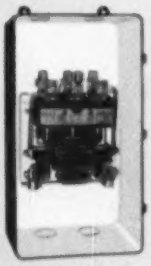
Reason No. 1—SIMPLICITY. No pins, no pivots, no knife edges, no bearings, no linkages . . . no trouble making parts to slow up or interfere with uniformity of switch operation.

Reason No. 2—MAINTENANCE FREE CONTACTS. Double break, silver alloy contacts need no filing or cleaning. Parallel contacts open and close at same time, assuring longer contact life.

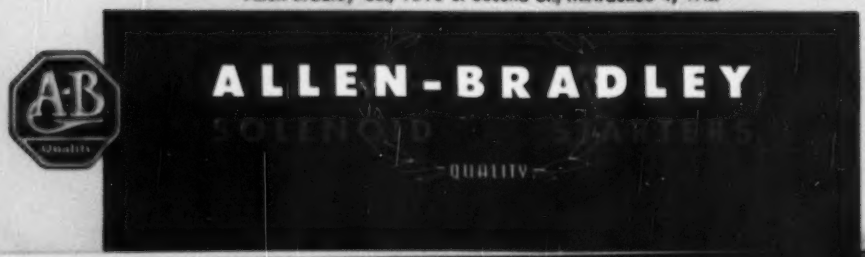
Reason No. 3—COMPLETE RANGE OF SIZES. Only Allen-Bradley offers a complete line of solenoid starters from Size 0 (15 amp) to Size 7 (900 amp). All have double break, silver alloy contacts.

Reason No. 4—ALL TYPES OF ENCLOSURES. The various types of Allen-Bradley enclosures afford proper protection for operators and starters under all industrial and atmospheric conditions.

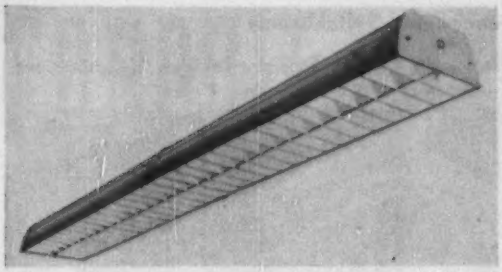
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.



Allen-Bradley Bulletin 709 solenoid starters—Size 0 through Size 5. Note the white interiors.



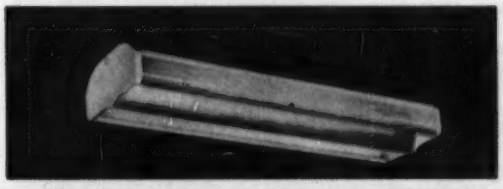
730-M

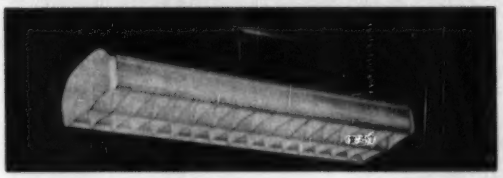


New Coronet Series

(5) Curtis Lighting Inc., Dept. CSB, 6135 W. 65th St., Chicago 38.

This new fluorescent series for all 4-, 5-, 6- and 8-ft. lamps, slimline, low-brightness or starter type, is designed for offices, schools, stores and other commercial interiors. Units are durably constructed with all control equipment enclosed in a steel housing. Side reflectors are available in either alzak processed aluminum or steel-finished baked white Fluracite. The line is engineered to give high illumination levels on the working plane and a substantial indirect component to relieve contrast between luminaire and ceiling. Luminaires come with either 40° crosswise and 40° lengthwise shielding or 40° crosswise and 25° lengthwise shielding.





Commercial Lighting System

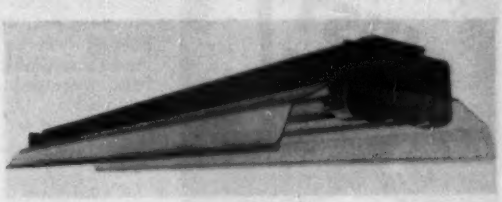
(6) Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago.

A 2-lamp lighting system of ten new luminaires called the Mid-Century line has been designed for stores, offices and schools. Features are translucent Lumi-sides of polystyrene plastic extruded in one piece to give low surface brightness; Down-Lite reflectors to increase downward component of light. The ten models use five lamp types including the 85-watt T-17 Krypton lamp and come in three lengths: 4 ft., 5 ft. and 8 ft. Details in Bulletin 399.

Industrial Fixture

(7) Fluorescent Fixtures of California, 3320 18th St., San Francisco.

The All-Brite RLM Industrialist is for factory and general industrial use; features RLM certified porcelain enamel finish with high reflection factor, standard or multiple twin- or triple-turret lampholders, special end plates for chain suspension, adjustable sliding hangar brackets for stem suspension, new joiner channels for end-to-end alignment of fixtures in continuous rows and flanges for louvers, the latter being available where required. Bulletin 104 FL gives details of the fixture, pictured below. Fixture is UL approved and IBEW labelled; parts are ETL approved, the manufacturer states.



Closet Light Unit

(8) Slater Appliance Division, Slater Electric & Mfg. Co., Inc., Woodside, Long Island, N. Y.

A complete 1-piece automatic closet light measures 2x2 in.; comes with 12 ft. of cord and two screws for installation. It is claimed that the unit can be installed in a few minutes time; fits any closet door; is quickly detached for moving. It is designed for either upper corner of the door frame. The switch operates automatically by action of the closet door; goes on when door is opened, off when it is closed. The cord goes under the door and is plugged into a convenience outlet in the room. A 25-, 40-, or 60-watt bulb may be used.

Kitchen F Light

(9) Sylvania Electric Products Inc., 500 Fifth Ave., New York.

This circular fluorescent fixture is for lighting kitchen areas, such as over the sink or in the pantry, or for similar lighting jobs in the home. The newly designed fixture is finished in baked white enamel to blend with ceilings, has a polished aluminum reflector and uses a circular F lamp, 12 in. in diameter. The unit is said to be easy to install and to fit any size outlet box. It gives more light than the size incandescent bulb generally used in similar areas and is said to distribute the light more uniformly around the work area and eliminate glare. It is suggested by the manufacturer for use in small kitchens, kitchenettes or dinettes, bathrooms, sewing rooms, sun porches or over stairway landings.

THE NEW
OHIO
MOTOR AND GENERATOR BRUSH WALL CHART

For easy selection, brushes are pictured and arranged in groups showing styles with dimensions—a time saver when making brush replacements. Write for your copy.

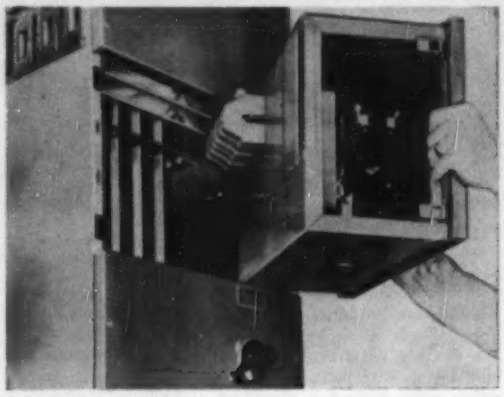
ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St.
Los Angeles 13, Cal.

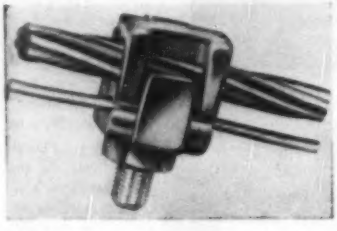
THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

Custom-Built, Pre-engineered Switchboards

(10) Trumbull Electric Mfg. Co., Merchandising Division, Plainville, Conn.



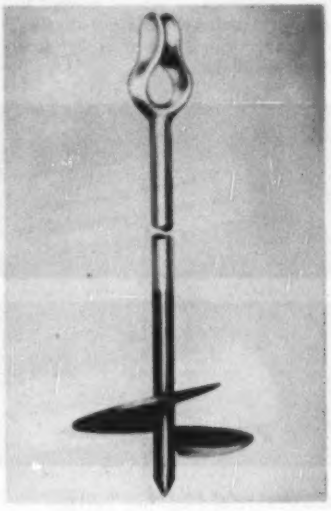
Called Centr-A-Power, this new line of custom-built switchboards is designed to centralize power and lighting switching in one dead-front, free-standing package. It consists of a series of vertical rigid steel troughs into which are inserted all types of switching devices. All troughs are connected by continuous power bus that may be fed from the bottom or top of the trough. Individual switchboard units take power from silver-plated, vertical bus bars by means of spring-loaded stabs located to back of units. Each unit is mechanically and electrically isolated from other units in case of faults or short circuits. The standard 18-in. trough mounts circuit breakers up to 600 amp. and fusible switches up to 200 amp., 600 volts maximum. Two larger-size standard sections of 22- and 28-in. widths are available for fusible devices up to 1,200 amp. maximum, and for circuit breakers up to 1,600 amp. maximum. All troughs are 90 in. high and line up in appearance and mechanically with large, rigid-type switchboards.



Distribution Connectors

(11) Anderson Brass Works Inc., P. O. Drawer 2151, Birmingham 1, Ala.

These 1-piece bronze distribution connectors, Series K-90 and K-900, are for making taps, splices and dead ends. Each series includes four sizes of connectors to accommodate copper conductor combinations from No. 8 to 500 MCM. The K-900 series incorporates a conductor spacing bar for a more even distribution of current in connections.

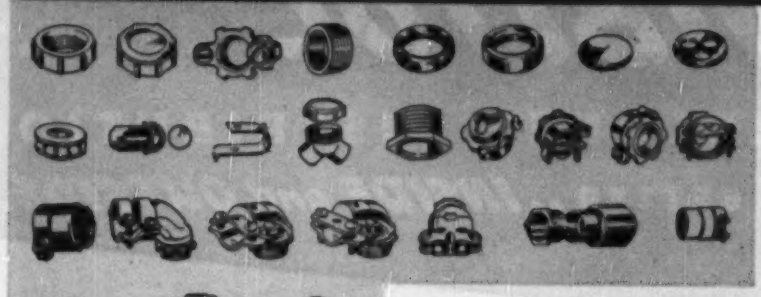


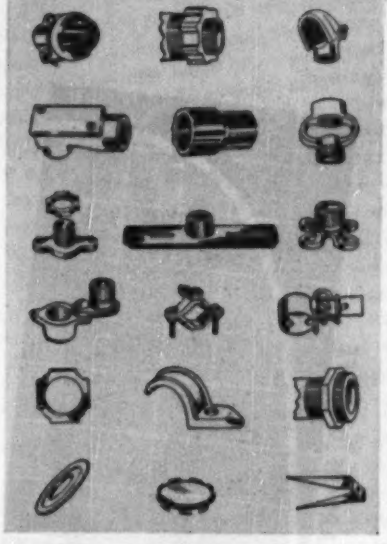
Screw Anchor

(12) A. B. Chance Co., Centralia, Mo.

A "king" size thimbleye on this screw anchor makes it adaptable for machine or hand installation. The opening is large enough to use a turning bar for hand installation and the rod head will fit adapters for hole boring machines. The single strand groove also prevents overloading the anchor with extra guys. The blade of the anchor is forged of structural steel and pitched to specifications in every size to get the best possible pitch for fast installation and maximum holding power, the manufacturer states. Comes in 4-, 6- and 8-in. diameters.

CONDUIT FITTINGS *by Steel City*





Steel City Conduit Fittings, which meet a wide range of wiring requirements, have been designed from a thorough knowledge of their individual needs.

They not only enable the craftsman to do the most satisfactory work at a saving of installation time, but they are carefully inspected during production and before packing to insure the contractor against any loss due to imperfections.

The quantity figure on a Steel City label . . .

. . . is the number of USEABLE fittings in the carton—there are no "culls".

CONDUIT FITTINGS in the STEEL CITY LINE

BUSHINGS
Capped—Grounding—Reducing
Insulating and Snap-in
BUSHING CLOSERS
CABLE CLIPS
CAPPED ELBOWS
CHASE NIPPLES
CONNECTORS
Straight and Angle Types
Separate and Set-screw Types
Hinged Type and Duplex
Type
For Armored Cable
and Non-Metallic Sheathed Cable
COUPLINGS
Three-piece and Combination
END FITTINGS
ENLARGERS
ENTRANCE CAPS
ENTRANCE ELLS
FIXTURE EXTENSIONS
FIXTURE HANGERS
FIXTURE STUDS
Bolt and No-bolt types
Steel and Strap Combination
FIXTURE OFFSET EXTENSIONS
GROUNDING CLAMPS
GROUND STRAPS
LOCK NUTS
PIPE STRAPS
REDUCERS
REDUCING WASHERS
SNAP-IN BLANKS
STAPLES

. . . *and* IN ELECTRICAL BOXES and COVERS

Steel City *Leads* In Meeting Contractors' Needs

STEEL CITY ELECTRIC CO.

OUTLET BOXES AND COVERS — SWITCH AND FLOOR BOXES
JUNCTION BOXES, CONDUIT FITTINGS AND ELECTRICAL SPECIALTIES

PITTSBURGH, PENNSYLVANIA

Good things come in pairs

"INHIBITOL" .....

MOLONEY DISTRIBUTION ARE NOW BETTER .. INSIDE and OUTSIDE!

INSIDE

"Inhibitol", the new transformer oil that is now standard in all Moloney Distribution Transformers at *no extra cost*, greatly increases the normal maintenance-free life of transformers. The inhibiter greatly retards

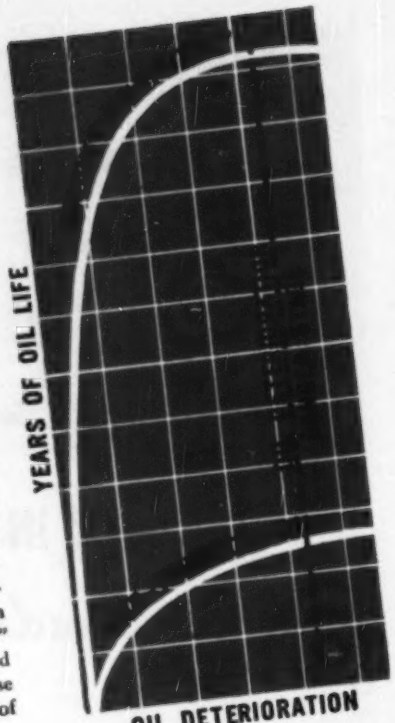
(1) oxidation,

(2) formation of acid which attacks insulation, and

(3) formation of sludge which slows heat transfer.

By test, the safe-operating life of Moloney *"Inhibitol"* is more than four-and-one-half times longer than the finest non-inhibited transformer oil.

Since distribution transformers must often carry considerable overloads during peak periods, high winding temperatures are the rule rather than the exception. At these high temperatures oil oxidizes most rapidly. Under overload conditions it is necessary that there be no restriction in the rate at which heat is transferred from the windings to the oil and it is therefore important that there be little or no sludge formation. Since regular programs for maintenance of distribution transformers are not usually practical, it is therefore important that they be supplied with an oil which is high in non-oxidizing and non-sludging qualities. *"Inhibitol"* resists the formation of sludge due to oxidation and retards acid formation which attacks insulation. These qualities of *"Inhibitol"* decrease the susceptibility of the transformer to electrical failure.



MOLONEY ELECTRIC

SALES OFFICES IN ALL PRINCIPAL CITIES

. . . and "VINYLTEX"

TRANSFORMERS

OUTSIDE

"Vinyltex" is the remarkable new vinyl base paint that is now standard on Moloney Distribution Transformers. This new finish offers protection which competes with porcelain enamel in lasting durability but does not have its disadvantage of brittleness. It is a hard, weatherproof paint that resists scratching, scuffing and chipping and withstands extreme weather conditions better and longer than any other tank finish on the market . . . *and looks better while doing it.* *"Vinyltex"* is especially practical for coastal installations since it has been found to be the best all-around finish yet developed for resistance to salt spray and intense sunshine. *"Vinyltex"* remains flexible under the most extreme ranges of temperature encountered in normal transformer operation and flexes with the metal it protects.

The ability to withstand bumping, scraping and abuse during handling is extremely important in a transformer finish. Such abuse often results in damage to the paint exposing the tank metal which causes rusting. *"Vinyltex"* protects the tank from this damage with its toughness, and its excellent weathering qualities help to maintain this superior finish for a much longer period of time than was formerly obtained with any other transformer finish.

Tanks are thoroughly cleaned, sand blasted and then sprayed with a prime coat. This is thoroughly baked and is then followed by a coat of *"Vinyltex"* and again baked. Resultant protective coat is durable and highly weather resistant.

Moloney Distribution Transformers with *"Inhibitol"* and *"Vinyltex"* are available in all standard ratings and voltages. Illustration shows a 15 Kva Transformer with sidewall mounted high voltage bushings for use on systems 5,000 volts and below and a 15 Kva Transformer with cover mounted bushings for use on systems above 5,000 volts.

MOLONEY ELECTRIC

COMPANY

FACTORIES AT ST. LOUIS, MO. AND TORONTO, ONT., CAN.

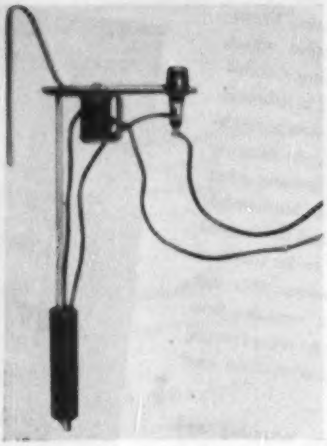
Dependable Lighting in the Presence of Moisture and Non-Flammable Dusts, Gases or Vapors

is assured by the substantial protection built into Pyle-National Vaportight Pylets. Heavy cast metal bases, weathertight sealing, and heavy guards, are features that provide for the most severe operating conditions of industrial service.

The Pylet line includes a complete range of types, including types for conduit and wall mounting, universal 4 and 5-hub types, two and three gang, handrail and outlet box fixtures for 10 watt to 200 watt lamps. Also Midget fixtures, plugs and receptacles, switches, junction boxes and other vaportight Pylets. Consult your Pylet Catalog 1100 for complete listings.

THE PYLE-NATIONAL COMPANY

1334 N. KOSTNER AVE., CHICAGO 51, ILLINOIS
Pacific Coast Sales Office
25 Beale Street, San Francisco 4, Calif.



Buzzer-Type Overload Indicator

(13) Line Material Co., Milwaukee 1, Wis.

Developed in cooperation with several large utilities, this Load-Alarm buzzer-type transformer overload indicator can be be used on all types and sizes of distribution transformers. While visual indicators rely on the company for detection, the audio principle gives a check by customers. The Load Alarm is installed inside the transformer and operates when a replaceable eutectic alloy fusible element (with a predetermined melting point of 65, 75 or 85° C, plus or minus 5° C) melts. The melting of the alloys allows contacts to close an electrical circuit that operates the buzzer.

The Load-Alarm is connected electrically to the secondary side of the transformer. Since it is attached directly to the transformer tank by a metal mounting strap, the sound of the buzzer is greatly amplified since the transformer tank acts as a sounding board. The secondary conductor serves as a medium through which this sound is transmitted. The noise is unusual and gives the customer a reason to call the operating company.

The indicator contains a small fuse that can be removed to stop the buzzing until the transformer can be replaced. Details in Bulletin 50015.

Inhibitors Added

(14) Westinghouse Electric Corp., P.O.Box 2099, Pittsburgh 30, Pa.

Inhibited insulating oil is now standard in the manufacturer's pole-type distribution transformers 100 kva. and smaller and 15 kv. and below. Addition of excellent synthetic inhibitors now available greatly increases oxidation resistance of Wemco-C oil used in these transformers, according to the manufacturer, who states that life of the oil is more than trebled. Addition of these inhibitors in no way affects electrical characteristics of the oil and Wemco-C will mix with other good inhibited oils, it is stated.

(15) MAINTENANCE BODY—A new line of public utility bodies has been added to the Powers-American line. Arranged to give comfortable transit for four men, in addition to those in the cab, the new bodies provide compartment space for carrying a variety of tools and materials. They are said to be particularly useful for surveying crews and maintenance gangs and for carrying extra tools and men to large construction jobs. McCabe-Powers Auto Body Co., Utility Body Division, 5900 N. Broadway, St. Louis 15, Mo.

(16) HOOK STICK SWITCH—A 1,200-amp. hook stick switch for voltages from 7.5 through 23 kv. is one of a new line developed by A. B. Chance Co., Centralia, Mo. Features are method of applying contact pressure and the lever pryout action of the pull ring mechanism. A split contact tongue permits pressure of the blade to be centered directly over the contact area. Blade pressure is applied by a heavy coil spring outside the contact point. Available in single-throw or tandem transfer design for vertical or underhung mounting; meets NEMA and AIEE requirements.

(17) THREAD RESTORER—Particularly suited for reconditioning closely spaced studs and bolts that are battered, distorted or rusted, this restorer is being produced by Buckingham Mfg. Co. Inc., Binghamton, N. Y. It is an addition to a line of four thread restorer tools and completes a range of sizes to take care of all ASME and SAE standard threads from ¼-in. up to 4-in. diameter. It has a swing of only $2\frac{15}{16}$ in.

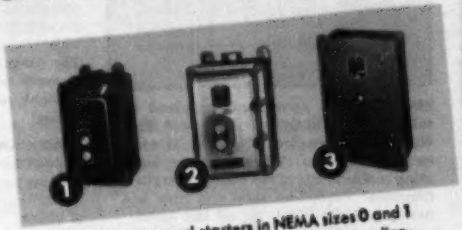
(18) WIRE STRIPPERS—Ideal Industries Inc., 1036 Park Ave., Sycamore, Ill., has purchased the line of Pyramid Products Co. and is now offering the E-Z wire stripper, a small, hand-operated tool for removing insulation from wire. This tool works like pliers, is of all-steel construction. Henceforth it will be manufactured in Ideal's Sycamore plant.

for **DEPENDABLE PERFORMANCE!**

Square D Manual Motor Starters

More than a million Square D Manual Starters have been put to work during the past twenty years on small machine tools, punch presses, fans, blowers, grinders, buffers, pumps, compressors, and portable electric tools. They've been selected for a lot of good reasons —among them:

Dependability. They're designed to "take it." **Operator Safety.** Cover and "STOP" button can be padlocked. **Convenience.** They're easy to install. **Overload Protection.** Melting alloy overload relays of unit construction provide close, accurate motor protection—"trip-free" mechanism prevents holding motor circuit closed against overload. **Parts Kits** simplify and speed up normal maintenance.



Square D offers manual starters in NEMA sizes 0 and 1 for non-reversing, reversing, or two-speed applications. A variety of enclosures is available. Shown above 1 Water and Dust Tight 2 Hazardous Locations 3 Flush Mounting.

Write for Bulletin 2510W. Address *Square D Company*, 4335 Valley Blvd., Los Angeles 32, Calif.

SQUARE D COMPANY

DETROIT · MILWAUKEE · LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

POWER TAPER wraps Kenworth Truck ignition harness with "SCOTCH" No. 33 Tape.

Now...plastic tape battles weather all over the world!

QUICK FACTS ABOUT "SCOTCH" No. 33 Electrical Tape

- TOUGH—plastic backing is abrasion resistant, unaffected by water, oil, alkalies, alcohols, sunlight.
- HIGH DIELECTRIC—over 7,000 volts.
- THIN CALIPER—only .007 inch thick.
- FLEXIBILITY—conforms snugly to uneven surfaces, odd shapes.
- NON-CORROSIVE—contains no sulphur-bearing compounds.

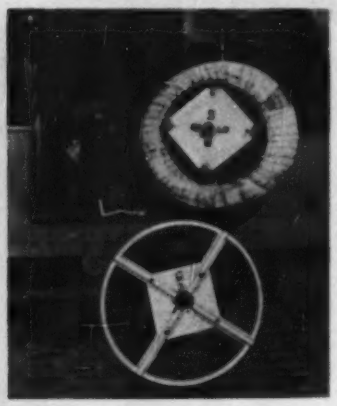
REMEMBER—for permanent high-heat insulation use "SCOTCH" Electrical Tape No. 27. Glass-cloth backing, thermo-setting adhesive. Whatever your insulating problem, one of the many "SCOTCH" Electrical Tapes can save you time and money. Write today for all the facts!

Ignition harnesses on Kenworth Trucks from South Africa to British Columbia wrapped with "SCOTCH" No. 33 Electrical Tape

Huge Kenworth Trucks need rugged insulation to operate in practically every climate in the world. That's why the manufacturers wrap ignition harnesses with "SCOTCH" No. 33 Electrical Tape. The smooth, plastic backing of this easy-to-apply tape gives a neat seal that resists sunlight, rain, snow and ice. Trucks keep rolling!

Why not let us show you the right "SCOTCH" Electrical Tape for your insulating problem? Just write Dept. EP-115 for complete information. No obligation, of course.

Made in U.S.A. by MINNESOTA MINING & MFG. CO., St. Paul 6, Minn., also makers of other "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-Slip Surfacing, "3M" Abrasives, "3M" Adhesives.
General Export: Durex Abrasives Corp., New Rochelle, N. Y.
In Canada: Canadian Durex Abrasives Ltd., Brantford, Ontario.



Wire Reel

(19) Line Material Co., Milwaukee 1, Wis.

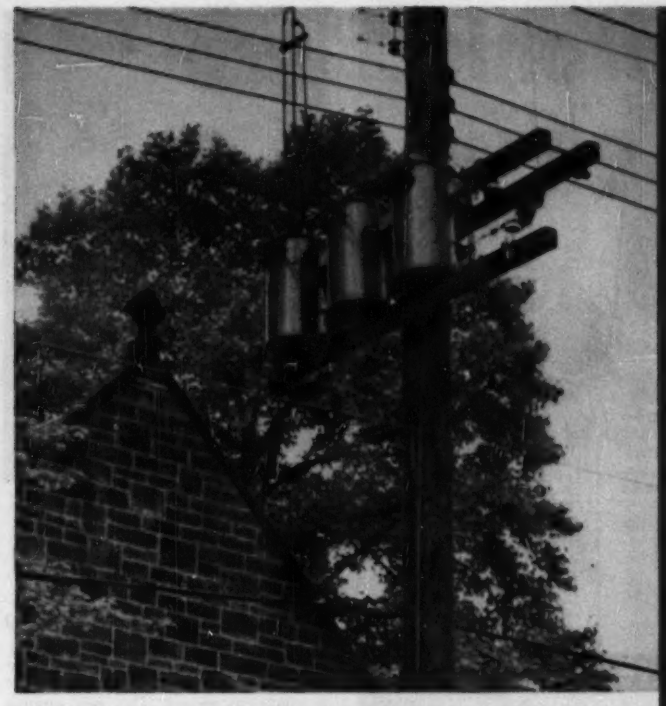
This redesigned adjustable wire reel may be mounted on a factory supplied pivot to give 90° swivel, fits all standard wire coils, is said to eliminate jerks and tangles, to reel in or out smoothly and swing easily.

The reel consists of a retaining plate fastened to a hub. Four adjustable supporting arms are attached to the hub upon which the coil of wire is positioned. The front retaining member is then placed in position and through the use of a special adjusting crank fitted to the hub, the supporting arms are expanded simultaneously until all four exert an equal pressure on the inside diameter of the wire coil. An adjustable band-type brake is then brought into contact with an inside flange to supply enough drag and prevent the coil from continuing to revolve after the lineman has stopped pulling wire from the reel.

A special handle is available to reel the wire in. It is attached to the outer periphery of the reel, permitting easy and kink-free reclamation of the wire. Adjustable supporting arms accommodate wire coils with inside diameters of from 17½ to 23½ in.

(20) STARTERS AND CONTROLLERS—Improved standardized enclosures for across-the-line starters and starters in combination with circuit breakers are available from Russell & Stoll Co., 125 Barclay St., New York. Starters range from size 0-4 for use in explosive atmospheres and atmospheres containing excessive amounts of vapors or dust.

(21) MOTORS—Sterling Speed-Trol electric power drives are now available in the single-phase capacitor-type design. These new motors come in ratings of from ½ to 3 hp. inclusive and give 2:1, 3:1 or 4:1 speed variations; have 18 different maximum speeds from 2,000 r.p.m. down to 52 r.p.m. Made by Sterling Electric Motors Inc., Los Angeles 22.



A 1000 kva power transformer ready to receive sound level tests in Allis-Chalmers Pittsburgh Works sound laboratory. Laboratory walls of concrete, glass wool and acoustical tile exclude 99.98% of exterior noise power.

Here a distribution transformer is getting sound and harmonic analysis. Physical noise level and harmonic index are new tools to measure sound energy. Transformer designs, in addition, are tested in accordance with ASA and NEMA standards.

Quiet Neighborhoods NEED QUIET TRANSFORMERS

How to Beat Transformer Noise—That's The Problem Allis-Chalmers Engineers Are Tackling In Their Pittsburgh Sound Laboratory

TODAY'S DEMAND FOR quieter transformers is stronger than ever before. Larger rated transformers are moving into residential areas as distribution systems grow up. That's why holding customer good will depends more and more on keeping transformer sound level low.

What is Allis-Chalmers doing about sound level? In cooperation with sound experts, Allis-Chalmers engineers are conducting research on new electrical core steels in an effort to reduce magneto-striction and resonance. They're testing effects of clamping pressures, core impregnation and anchoring of core and coil assembly. Their laboratory is specially equipped for sound level experiments.

What will be the result? Transformers that create good will. Research, engineering and production are teaming up at Allis-Chalmers to give you a transformer that is truly a good neighbor.

For details on Allis-Chalmers transformers contact your nearby A-C sales office or write for bulletins:

Bulletin 61B7309A — *ACP* (Allis-Chalmers self-protected) distribution transformers.

Bulletin 01B6168B — Complete A-C power and distribution line.

Bulletin 61B6014A — Substation transformers, 50 to 500 kva.

A-3170

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ACP (Allis-Chalmers Protected) is an Allis-Chalmers trademark.

ALLIS-CHALMERS

magno-tronic

DUAL SILVER POINT — FULLY AUTOMATIC

FLUORESCENT STARTERS

—completely eliminate annoying blinking and flickering of dead fluorescent lamps!

GUARANTEED — FOR ONE YEAR!

PROTECTS — Automatic thermal relay cuts out defective lamps, eliminates annoying blinking and protects all auxiliary equipment.

SIMPLIFIES — Replacement of defective lamp automatically recycles starter circuit. No buttons to push — no replacement of starter.

REDUCES COST — Magno-Tronic starters provide exact timing of electrode heating, preventing excessive loss of emission material, thus assuring maximum possible lamp life.

VERSATILE — Built to operate efficiently over an extended voltage and temperature range.

Demonstration and Literature on Request.

SP-15-20 For use with 15 or 20 watt lamps.

SP-30-40 For use with 30 or 40 watt lamps.

SP-85-100 For use with 100 watt lamps.

Manufactured under U. S. PATENTS

2298236 2159837 2339307
2334925 2339346 2333694
2341520 1849152

Other Patents Pending

INDUSTRIAL ELECTRONICS CORP.

General Offices & Main Plant: 80 BANK STREET NEWARK 2 N. J.

Oilproof Enamel

(22) Irvington Varnish & Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.

Advantages claimed for No. 32 Red oilproof enamel are fast rate of drying unusual stability and superior resistance to the most severe conditions met in electrical service. This new enamel air dries to handle in a half hour and hard in eight hours. Drying can be accelerated by a low-temperature bake.

The enamel is supplied at a consistency for easy brush application. According to the manufacturer, it bonds well to insulating materials and metals, making it a good finish for such parts as bus bars, commutator connections, stator ends, field coils and similar irregularly shaped windings. It dries to form a tough, resilient film with dielectric strength of 800 volts per mil. The coating is said to exhibit excellent resistance to oils, moisture, chemicals, abrasive dust, greases and water.

(23) CONTROL STATIONS—A new 12-unit enclosure has been added to the line of Oil-Tite control stations manufactured by Westinghouse Electric Corp. The Class 15-022, type OT pushbuttons, designed for machine tool control and other heavy-duty installations, are now available in control stations accommodating any desired combination of 1, 2, 3, 4, 6, 9 and 12 units.

(24) LAMINATE—Lamicoid No. 6026 resists blistering, splitting and delamination when subjected to a temperature of 250°F. for 36 hours, according to its manufacturer, Mica Insulator Co., Schenectady 1, N. Y. It is available in thicknesses up to ¾ in. inclusive. The power factor of this thermosetting paper base laminated plastic at 1 mc. is 0.032, at 60 cycles is 0.012. It is said to display exceptionally low losses at commercial frequencies under different voltage stresses.

A STANDARDIZED UNIFORM PRODUCT

The "Three E" Form A line of INDOOR BUS SUPPORTS are designed to meet the operating conditions encountered in medium* size power plants, substations, customers vaults, etc.

They are available in voltage ratings of 5000, 7500, 15000 and 25000. Clamps can be had for flat bar (vertical or horizontal) tubing, rod, cable or other styles of conductors. Mounting bases are adaptable to pipe or flat surface mounting. The insulator unit is of high grade wet process porcelain, brown glazed.

This style of bus support has been in active production for almost thirty years. Thousands of them are in service.

Our ample stocks enable us to make prompt shipments.

*A line of heavy duty bus supports are available for large power installations.

Ask for bulletin 226. It describes this line completely.

ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

YOU CAN BE SURE.. IF IT'S
Westinghouse

IT TAKES A UNIT-BUILT DAMPING MAGNET
FOR *Calibration that "stays put"**

The permanent magnet of a Watthour Meter must provide a constant restraining force on the rotating element.

A special chrome-steel, treated and aged, gives constant strength to Westinghouse damping magnets . . . throughout the life of the meter. Temperature compensation means calibration "stays put" under all temperature changes. Copper plating guards against the weakening effect of lightning surges.

Nothing is overlooked. Mounting surfaces are precisely machined. The magnet can't shift or slip. It may be removed and replaced without disturbing calibration. Maintenance time is reduced to a bare minimum.

These refinements are characteristic of the care and workmanship that go into Westinghouse Watthour Meters. Get the complete story. Write for the new booklet, "What It Takes for Long-time, Low-cost Metering", B-4665, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-40368

Westinghouse
METERS

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver.

*A VITAL PART OF LONG-TIME, LOW-COST METERING

Here's why it pays to use

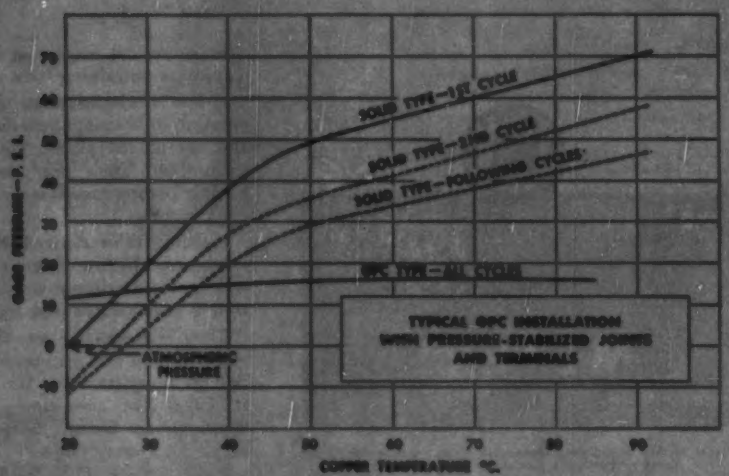
GPC GAS PRESSURE

1. Greatly improved service reliability at little added cost.
2. Positively avoids burst or collapsed joints.
3. Relieves the sheath of high internal pressures that aggravate fatigue failures.
4. Prevents moisture being drawn into the cables.
5. Maintains constant supervision over the integrity of the sheath and tightness of joints and permits location of sheath breaks before failure can occur.

Increased current carrying capacity is an important advantage of GPC Cable. Made possible because sheath stresses are carefully controlled.

Comparison of internal pressures during heating

Solid type cable versus GPC Gas Pressure Compensated Cable.



COMPENSATED CABLE

for both high and low-voltage

■ Engineers are generally familiar with the troubles experienced with high voltage cables due to the internal pressures and vacuums generated by the expanding oil saturant of the cable.

Our "GPC" Gas Pressure Cable offers a complete solution to that problem.

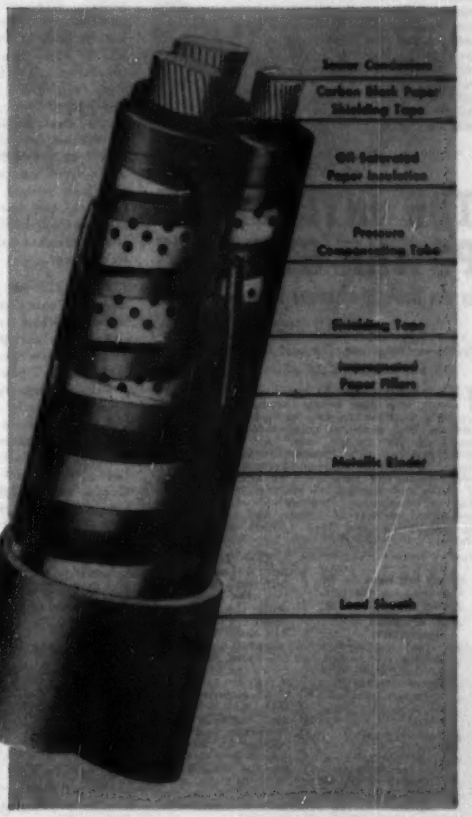
It is not generally appreciated that the cable expansion problems are not restricted to high voltage cables but are equally prevalent in all types of paper insulated cables. Failures in 600 volt paper cables are attributable to lead failures in the majority of cases.

The "GPC" Gas Pressure principle is equally applicable to low voltage multiple conductor cables. By providing perforated tubes to act as a cushion for the expanding oil, and a nonperforated tube to act as gas pressure feed for stabilizing joints, terminals and the entire cable run, the internal pressure can be controlled within the safe limits of operation of the sheath and kept above atmospheric at all times.

The result is that stretched sheath and burst or collapsed joint sleeves are avoided. Moreover, the harmful effect of longitudinal expansion at manhole bonds is minimized since one source of strain in the sheath is avoided.

In case the sheath is damaged by mechanical injury, corrosion or repeated bending, the pressure of the gas will prevent moisture from being drawn into the cable, and the lowering of gas pressure on the system will give immediate warning that a damaged sheath exists. It is not difficult to find the location of the leak either by observation, gas pressure drop or gas flow devices installed on the joints.

Type GPC Cable and the necessary accessories add a very small percentage to the cost of the cable installation. GPC Cable is recommended for all installations of multiple conductor cables, especially those subject to wide fluctuation in temperature, such as aerial cables or power feeders carrying heavy loads. Write for complete engineering information.



AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

AMERICAN PAPER INSULATED CABLES

UNITED STATES STEEL

Plainly outlining . . .

integrated power systems

as a prime tool in providing adequate electrical power

THIS BOOK presents a compact, easy-to-read survey of the economic, sociological, and technical aspects of the integrated power systems as a source of the adequate electric power so important in conserving our natural and human resources. It considers the economic advantages of the system, also analyses the multitude of technical considerations involved, pointing up the coordination necessary to achieve the full results of which the integrated system is capable.

JUST PUBLISHED!

THE INTEGRATED POWER SYSTEM

As the Basic Mechanism for Power Supply

By PHILIP SPORN

President, American Gas and Electric Company

187 pages, 5½ x 8, 28 illustrations, $4.00

THE PRODUCT of 20 years of study and analysis, this book treats the integrated power system's position in the socio-economic structure in this country, emphasizing the importance of its future role. It discusses the advantages of the integrated system over a chain of power systems operated independently—from the viewpoint of savings in size of units and amount of reserve, lowered margins of insurance, utilization of the most economical sources of supply, and operation of all generating and load centers as a basic whole.

Check this book for information on the integrated system such as:

- its advantages and disadvantages
- its technical bases
- importance of skilled coordinating personnel
- sources of power
- components and tools
- how it develops latent energy
- its social economic position
- and many other questions concerning various aspects of the integrated power system.

Even though it is not primarily a technical investigation, the book deals with the technical bases, components, and tools of the integrated system. Discussed are the generator, transmission, distribution systems; the tools which protect and regulate the system; and the role of skilled personnel in coordinating the system.

A final chapter shows the actual growth of a typical system.

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BULLETINS ETC.

[25] INFRARED AND INDUCTION HEATING—In a 16-page booklet, Wueller Infra-Red and Lighting Co., 1445 Stevenson St., San Francisco 3, describes and illustrates its line of portable Heatmobiles and other infrared drying installations and units. Replacement parts and accessories are listed, special applications are described, and a tabulation of uses by industries is included.

[26] SUBSTATION—A single-circuit unit substation, arranged for maximum accessibility and easy maintenance, is described in an 8-page bulletin from Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis. The entire substation, including transformer, regulator and switchgear, is contained in a single weatherproof enclosure and mounted on a single steel base. Meters, recording instruments and control panel are in a safe, dead-front compartment accessible behind the unit's front weatherproof hinged door. Current transformers, transformer secondary connections, bus work and internal terminations are located behind the hinged rear door. The switchgear has drawout-mounted auxiliary transformers.

[27] CABLE—A 60-page catalog describing its power and control cable constructions has been published by Rome Cable Corp. Dimensional data and electrical and physical characteristics are presented covering low- and high-voltage power cables, service cables, street lighting, station control and municipal signal cables. In addition there is a discussion of insulations and sheaths, both thermoplastic and thermosetting. One section is devoted to electrostatic shielding practices based on latest IPCEA recommendations. Copies are available from the manufacturer's advertising department, Rome, N. Y.

[28] PRELUBRICATED BEARING DESIGN—Bulletin B-2201 from Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland 10, Ohio, gives description and drawings of double-shielded bearings and their bracket mounting.

[29] MOTOR STARTERS—An 8-page booklet describing Slipsyn synchronous motor control, for operation and protection of all types of synchronous motor drives, is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. The booklet is B-4379.

[30] SCHOOL LIGHTING—"Guide to Lighting Educational Institutions," a 52-page handbook published by Holophane Co., Inc., 342 Madison Ave., New York 17, has more than 175 illustrations giving data and recommendations for educational lighting needs. Teaching areas from classrooms to chapels and from libraries to laboratories are covered, showing installation photos, lighting layouts and illumination levels.

[31] CABLE—Super Coronol-Geoprene cable for circuits up to and including 15,000 volts is discussed in Publication 19-150 from General Electric Co. Construction Materials Department, Bridgeport 2, Conn. This cable is suitable for direct burial in the ground or in aerial or raceway installations.

[32] SUPPORTS—Conductor rail supports are covered in Delta-Star Electric Co.'s Publication 5008. Manufacturer's address is 2400 Block, Fulton St., Chicago 12.

[33] SWITCHES—Publication 4904 from Delta-Star Electric Co., 2400 Block, Fulton St., Chicago 12, describes a line of high-capacity MK-40 switches with improved arrangement of contact shoes, simplified mechanical design and other features. Switches are listed in standard ratings of 7.5 to 69 kv., 2,000, 3,000 and 4,000 amp. for group operation in upright, vertical and inverted mounting positions.

[34] TEST SET—A field model for checking current transformer installations is described in Bulletin 54 from the Eastern Specialty Co., 3617 N. 8th St., Philadelphia 40, Pa.

[35] EQUIPMENT—Custom-built equipment for industry is the subject of a 10-page publication of the Electric Products Co., 1725 Clarkstone Road, Cleveland 12, Ohio.

[36] WELDING SUPPLIES—A catalog of its accessories is available from Lincoln Electric Co., Cleveland 1, Ohio, as Bulletin 467.

[37] TRANSFORMERS—New literature on rural service distribution transformers has been released by Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis., as Bulletin 61B6726A.

[38] SCAFFOLDS—Information on Aluminum sectional ladder scaffolds is given by the Patent Scaffolding Co., 3821 12th St., Long Island City 1, N. Y., in Bulletin PSS-2G.

[39] CONVERTERS—Cornell-Dubilier Catalog 410 covering its line of Powercon vibrator converters is available from the manufacturer at South Plainfield, N. J.

[40] EARTH DRILL—A portable 5-hp. gasoline-powered post-hole digger made by McCulloch Motors Corp., 6101 W. Century Blvd., Los Angeles, is claimed to drill at high speed in any type of earth or clay. Augers of 6-, 9- and 12-in. diameter are available.

Fill in the Postcards on Page 51

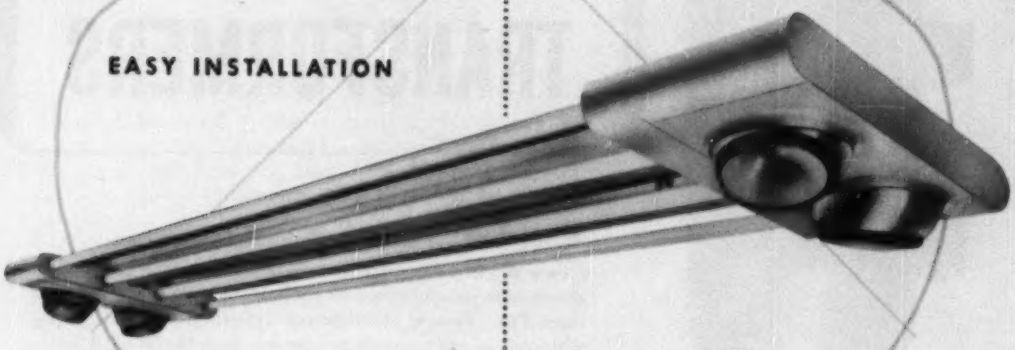
Manufacturers' bulletins are a good way to keep informed. To get more information about new products listed in this section or to secure the bulletins mentioned on this page, fill in and mail the bottom postcard on page 51.

Information on any department in the magazine can be secured by filling out and mailing the second postcard on page 51. Use this card for asking questions or making suggestions.

HIGH EFFICIENCY

LOW MAINTENANCE

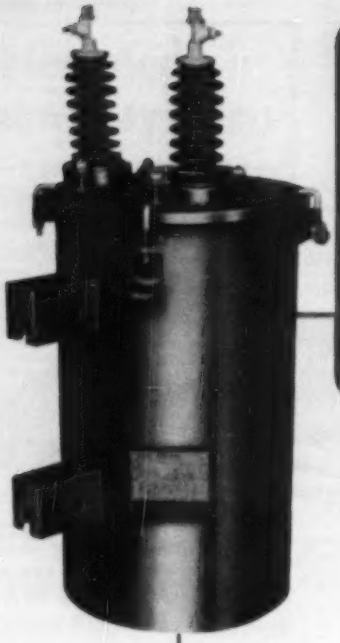
EASY INSTALLATION



For high efficiency and low maintenance in store and market lighting your specifications should call for SUNBEAM'S open type slimline 1300 series fixtures. Over 90% efficient (ceiling mounted), these units provide a uniform, wide spread of light over the sales and display areas. Only 5" in depth, they are ideal for service stations and working areas which have low ceilings. Adequate knockouts allows for quick and easy installations. This 2- and 4-light series is available in all slimline lamp lengths and milliamp ratings, including the 48" T-12 430M.A.
For display accent lighting use the matching incandescent eyeball spotlights. A matching double-spot on a 4-light, 72" unit is illustrated above. Shown below is a typical market installation of SUNBEAM'S 1304-96" luminaires.

For SUNBEAM'S complete line of advance lighting fixtures, see your leading electrical distributor.

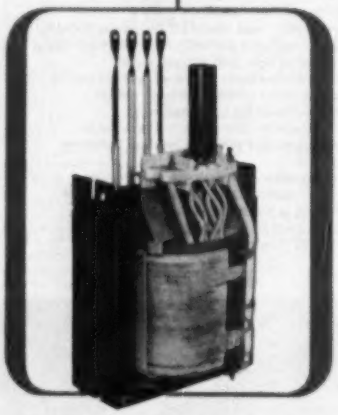
SUNBEAM LIGHTING COMPANY
777 EAST 14TH PLACE • LOS ANGELES 21, CALIF.



WAGNER

Form W

TRANSFORMERS



The Form W core is made of cold rolled oriented grain transformer steel, carefully annealed to obtain the lowest practical magnetic losses. The preformed core is assembled in rectangular shape to provide a path for the magnetic flux parallel to the grain of the steel.

What Does Form W Mean?

Form W is the general type designation of our new line of distribution transformers with cores of cold rolled oriented grain steel. The Form W Distribution Transformer is built to pay dividends in extra service because it's built the Wagner way—the design had to be proved before it was put into production . . . every piece of material and every construction and assembly step had to be carefully controlled, checked, inspected and tested to rigid Wagner specifications.

Small Size—Light Weight

The Form W design results in considerable reduction in the size and weight of all ratings. Form W Transformers require less oil and are compact and easy to transport, store and handle—exactly *right* for modern distribution systems. But Form W Transformers are liberally designed, and no compromises are made merely for the sake of a few inches or a few pounds.

Excellent Electrical Performance

Core and copper losses are relatively low; regulation at both 100% and 80% PF are good; and exciting current is extremely low. When you add high short time overload capacity, you have a transformer that gives the type of service you need.

* * *

Wagner Form W Distribution Transformers are available in ratings through 15 KVA, 15,000 volts and below.

Why not investigate the Form W today? Just call your nearest Wagner branch, or write us.

Wagner Electric Corporation EST. 1891

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave., St. Louis 14, Mo., U.S.A.

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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Advertising on page..... ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

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*Please include your company's name and your position, since we cannot ask manufacturers to furnish literature unless you do.

ELECTRICAL WEST

Reader Service

The editors of Electrical West will be glad to answer questions on engineering techniques; in the lighting and wiring fields; on the electrical code; on merchandising and appliance markets and other phases of the electrical industry in the eleven Western states

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HEAVY DUTY FUSE CUTOUTS

THE NEW G-E 100-AMPERE HEAVY-DUTY FUSE CUTOUT GIVES YOU

- **1 cutout for either 50- or 100-ampere requirements—with positive full range operation.**
- **Interrupting ratings of: 8000 Amperes at 2.5 KV**
  5000 Amperes at 5.2 KV

YET IT COSTS NO MORE THAN ITS 50-AMP PREDECESSOR

Cutout door without fuse link

OTHER FEATURES

- **POSITIVE INDICATION** of blown fuse is given by a double spring-operated indicator arm.
- **FLASHOVER PREVENTED** by a synthetic sponge-rubber barrier cemented to the cover.
- **RECOIL CUSHION** is achieved by springs located between the door and the hinge.
- **CLEAR IDENTIFICATION** from the ground is assured by a white disc monogram.
- **CORROSION SHIELDED** terminals and contacts.
- **EEI-NEMA STANDARD** mounting bracket provides side swivel and vertical or angle-tilted mountings.

Interior of cutout housing

YOU'LL LIKE THE ECONOMY AND RELIABILITY OF THIS NEW GENERAL ELECTRIC CUTOUT FOR YOUR HIGH CAPACITY FEEDERS. SEE YOUR LOCAL G-E REPRESENTATIVE FOR COMPLETE DETAILS, OR WRITE FOR BULLETIN GEC-704.

Apparatus Department, General Electric Company, Schenectady 5, New York

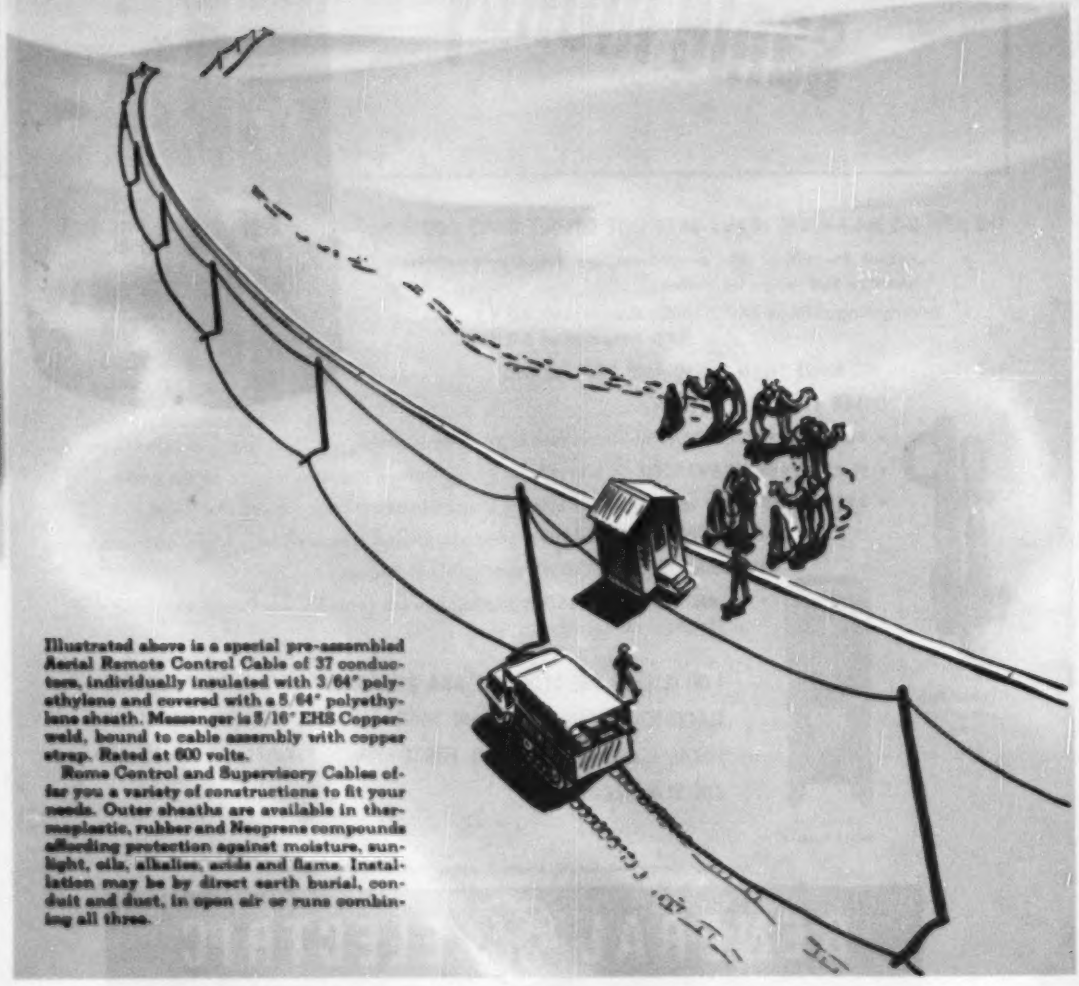
GENERAL ELECTRIC

406-17

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

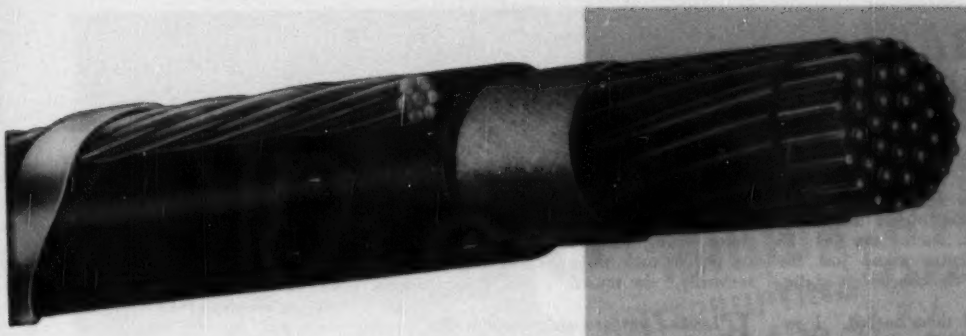
TEMPERATURES UP TO 110°!
WINDS UP TO 120 MPH!

Tough Conditions for Tougher Cables



Illustrated above is a special pre-assembled Aerial Remote Control Cable of 37 conductors, individually insulated with 3/64" polyethylene and covered with a 5/64" polyethylene sheath. Messenger is 5/16" EHS Copperweld, bound to cable assembly with copper strap. Rated at 600 volts.

Rome Control and Supervisory Cables offer you a variety of constructions to fit your needs. Outer sheaths are available in thermoplastic, rubber and Neoprene compounds affording protection against moisture, sunlight, oils, alkalies, acids and flame. Installation may be by direct earth burial, conduit and duct, in open air or runs combining all three.



Rome
CONTROL CABLES

You won't find more severe operating conditions than those encountered in the deserts of the Middle East. Blistering sun and violent winds combine forces to attack anything above ground.

That's why a well-known Middle East oil company with the problem of a sensitive, long-distant, remote control operation specified Rome Control Cable for the job. Long-time stability of electrical characteristics, sensitivity of operation, resistance to extreme weather were essential. The installation involved both aerial and direct earth burial circuits, especially designed for matched performance. Selection of Rome Control Cable for such rigorous service was no accident! It resulted from Rome's ability, through competent engineering and research, to design the *right cable for the job* and manufacturing facilities to produce it.

The permanent dependability of Rome control and signal cables assures years of efficient, trouble-free service for vital control functions. Control circuit failures are eliminated. If you have a difficult control cable problem, let Rome solve it for you. The coupon below will bring you specifications and test data. Mail it today.

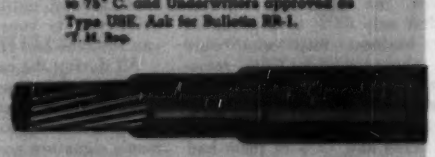
IT COSTS LESS TO BUY THE BEST

ReZone® Insulated Cables

ReZone is a superior oil-base ozone-resistant insulation for applications where highest quality and long service life are paramount. High electrical stability in wet locations, immunity to effects of corona and ozone, high dielectric and surge strength and low dielectric loss make Rome ReZone unexcelled for higher voltages. Manufactured with ReProne (Neoprene) or conventional cable coverings as specified. Recommended for operating temperatures up to 75° C. Ask for Specification RO-4.

ReMarine-ReProne® Cables

Here is the popular and economical combination of ReMarine, a super-aging and moisture-resistant insulating compound, and a ReProne (Neoprene) sheath. A multi-purpose cable for secondary network services, industrial power distribution, service entrances and control functions. Suitable for installation aerially, in ducts, on racks or direct in earth. Available as single or multiple conductor in a wide range of sizes. Recommended for operating temperatures up to 75° C. and Underwriters approved as Type USE. Ask for Bulletin RR-1.
®T. M. Reg.



ROME CABLE CORP., Dept. EW-11, Rome, N. Y.
Please send copy of new Rome Power and Control Cable Catalog.

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From Bar to Finished Wire

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ELECTRA'S HUSBAND

SOME LESSONS IN CITIZENSHIP

HOW did the folks at your office react to the bigger slice that Uncle Sam took out of the Oct. 15 paychecks?" Electra asked just the other evening at the conclusion of dinner.

"Oh, some of them beefed," I answered. "At one office I know about there was an almost universal demand for more pay to make up the difference. The folks just don't seem to understand that when it comes to taxes, we the people are the ones who pay. Most taxes are painless—hidden in the price of gasoline or theater tickets or electricity or rent. But not so with income taxes. The people really feel them because that is money taken away from them directly."

"If I had my way," Electra commented, "I'd do away with all taxes but direct ones. Then the folks who pay would do something about the kind of people they elect who levy the taxes. You ought to tell the folks in your office that they never will get any tax relief until they put the right people in public office."

"I have told them," I said. "However strangely enough when it comes to voting the average person makes an emotional rather than a rational decision as to candidates. It's how the guy sounds on the radio or looks on television or the kind of promises he makes that influences choice."

"Incidentally, how many of your people are going to vote?" she asked.

"Darned near all of them if a survey we made means anything," I answered. "There was a squib in *Business Week* the other day which showed that only 63% of a group of Colorado business men who were crabbing about politics were registered to vote. We took a cue from that and surveyed our gang with pleasantly surprising results. Some 92% of them were registered and 72% of them had voted in the June primaries. So I guess most of them will vote November 7."

"That's undoubtedly way above average," Electra said. "I'm going to survey some of my friends."

"They probably won't do nearly as well." I said. "Incidentally our survey revealed a real example of good citizenship. One gal reported that she had only reached her twenty-first birthday in September yet was registered to vote in November's election."

"There wouldn't be much of anything wrong with America if all of its people took their citizenship that seriously," she mused.

ELECTRA was grousing about traffic congestion one day when we were driving down town. Her comments reminded me of an experience during a recent visit to a factory in one of the country's major industrial communities. A window of the advertising department looked out upon a vast array of parked automobiles—thousands of them. I happened to remark that the traffic congestion just before 8 a.m. and just after 5 p.m. must really be terrific.

"The traffic snarl around this place must be the worst in the country," one of the fellows in the office said. "Everybody, and I mean everybody, tries to leave at once. And just to make matters worse, the bus company has raised its fare to 15c and more people than ever are driving their cars. It's a matter of protest I suppose, because it costs more than that to drive any kind of a jalopy to and from work. Wait around until 5 o'clock and I'll drive you to your hotel just so you can see how bad traffic can get."

All during the conversation a young mail girl (she could not have been more than 17 years old) had been standing waiting to get the advertising man's signature on some kind of document. As he signed, she spoke out to nobody in particular:

"I wonder if they have traffic jams like ours in Russia."

The incident didn't end there because later that same day we toured a portion of this great factory. It was a thrilling experience because here was a tangible demonstration of the thing that makes America the great nation it is today—the power and the strength that won World War II. But even more, here was an example of the enterprise, the imagination and the courage that has provided for us Americans a way of life that is the envy of all of the other peoples of the world.

At war's end the 35 acres now housed under this one roof had been bare land. Today it was a beehive of activity. Hundreds—perhaps thousands—of men and women were working on more than a million kilowatts of turbogenerating equipment. Huge formed steel shafts a couple of feet in diameter were slowly spinning in giant lathes. Turbine casings fifteen or sixteen feet in diameter revolved majestically on mammoth boring mills. Overhead monster cranes, some of them capable of lifting a couple of hundred tons, moved back and forth along the many aisles.

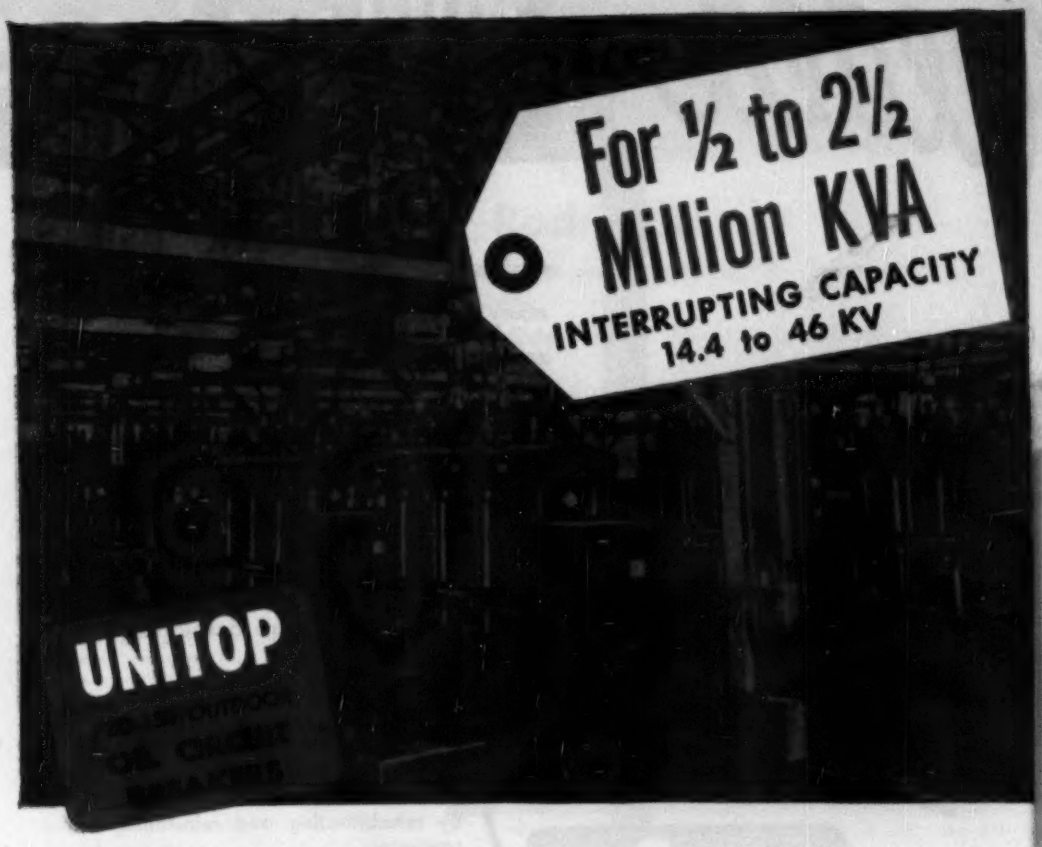
We made two round trips up and down the third-of-a-mile long aisles. With each journey the sensation of power and strength and enterprise compounded. It was a thrilling and inspiring experience.

"Do you remember what that little gal said in the office?" I commented. "Well I'll make a similar observation. Somebody ought to kidnap Joe Stalin and every other member of his Politburo. Then they ought to bring them over to this country."

"I know what you are going to say," the advertising man interrupted. "Then all of them should be brought up here for an inspection trip. I've thought about it many times."

"I would go you one better," I continued. "Somebody ought to arrange a real inspection trip schedule for them. Take them to plants in Detroit and Milwaukee and Pittsburgh and St. Louis. Include one of the big aircraft plants out on the West Coast on the schedule. Then send the so-and-so's home with this sage bit of advice: 'Now if you want to start something, go ahead and start it. However, we don't think that you'll be so anxious after what you've seen. And by the way, why don't you tell all of *your* people about this experience. You're afraid to. In fact if they knew about what you've seen in this country, they'd throw the whole bloody bunch of you into a concentration camp'."

"I think you've got something," he said.



- **MECHANICALLY TRIP-FREE PNEUMATIC OPERATOR** *assures positive tripping*
- ***UNITOP* FRAME CONSTRUCTION** *eliminates dirt-and-moisture-collecting crevices*
- **SINGLE-BREAK *RUPTOR* INTERRUPTING DEVICE** *for low arc energy release*

HERE'S HOW the Allis-Chalmers pneumatic operator with mechanically trip-free design assures instant tripping under any conditions. *On a fault, the operator is mechanically unlatched from the tripping mechanism.* By isolating tripping and closing mechanisms in this way, the tripping force doesn't have to work against valves or back pressures of any kind. This positive tripping action is a standard feature on all FZO-150 breakers.

COMPLETE WEATHER PROTECTION

One-piece, continuous heavy steel *Unitop* construction eliminates crevices that collect dirt and moisture. All three poles, under one top, are completely protected against severe weather conditions. Wiring is carried in sealed ducts within the top frame.

FAST, EFFICIENT INTERRUPTION

Arcs are quickly extinguished with simple, single-break *Ruptor* interrupting device. No unnecessary moving parts to bind or fail. Self-wiping, self-aligning contacts prevent formation of high resistance oxides, have low temperature rise.

Every FZO-150 breaker is factory assembled and tested, then shipped without dismantling so that test performance will be met in the field.

For details on the FZO-150 (bulletin 71B6421A) or other breakers to meet any utility need, contact your nearby A-C sales office. A-5072

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STANDARD RATINGS
8 cycle interruption

Rated KV	Max. Design KV	Rated Amps. (60 cycle)	Kva. Interr. Cap.
14.4	15.5	1200	1,000,000
14.4	15.5	2000	1,500,000
23.0	25.8	1200	500,000
34.5	38.0	600	500,000
34.5	38.0	1200	1,000,000
34.5	38.0	1200	1,500,000
34.5	38.0	2000	2,500,000
46.0	48.3	600	500,000
46.0	48.3	1200	1,500,000

ALLIS-CHALMERS

needed 1000 producers

Ordinarily, the needs of this Country (and many others) for conductor and strand are amply satisfied by the many fine American manufacturers of wire and cable. But now . . . and for some time into the future . . . when loads are mounting and demands for and on transmission systems are reaching unprecedented levels . . . when shortages of men and materials are developing . . .

You must be a producer of conductor . . .

HOW?

1. By rehabilitating and reinstalling old conductors.
2. By increasing the current-carrying capacity of existing lines.
3. By lengthening the life expectancy of present and future lines.

Preformed Armor Rods are for use under Patent No. 2,275,019 . . . other patents pending.

Preformed Armor Rods are furnished in half sets for splicing and/or repairing.

YOUR EQUIPMENT

All you need are Preformed Armor Rods and a *Pair* of hands for:

1 — Splicing, armoring at supports and dead-ends.

2 — Repairing conductors and strand in place or in your salvage yard for reinstallation.

3 — Jumpers for old splices.

# of conductor and strand...

Preformed Armor Rods will . . .

- **INCREASE the current capacity of splices, conductors in clamps, dead-ends and so on, by more than 30%.**
- **LENGTHEN the life of conductors where vibration, arcing and burning take their toll.**

Easily installed in three minutes . . . even by inexperienced linemen . . . Preformed Armor Rods protect conductors better and at lower cost than ordinary armor.

They are better because only PLP rods grip uniformly over the entire conductor length.

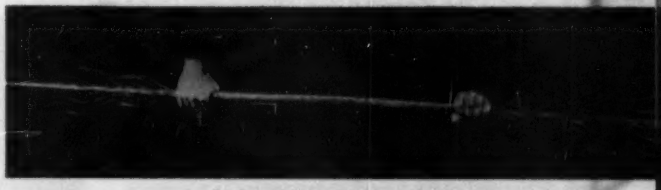
They are less expensive because your linemen make perfect installations every time, far quicker than with ordinary armor. Less expensive because only PLP rods eliminate concentrated stresses common in other forms of conductor protection.

Complete technical details and installation records are available. Just write to: *PREFORMED LINE PRODUCTS COMPANY, 1051 Power Avenue, Cleveland 14, Ohio.*

PLP ARMOR RODS ARE AVAILABLE IN ALUMINUM, COPPER, BRONZE, COPPERWELD, STAINLESS STEEL AND GALVANIZED STEEL—A TYPE FOR EVERY CONDUCTOR.

Take half to all of the rods needed and lay them across and around the conductor.

Wrap around conductor several times . . . like wringing water from a cloth. Apply remainder of rods.



Continue wiping action along conductor.

The finished job.

PREFORMED

PLP

LINE PRODUCTS CO.

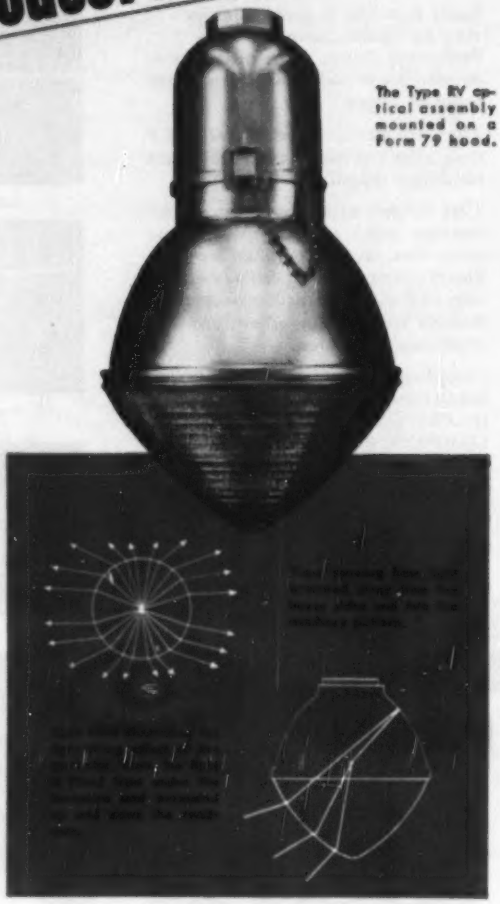
CLEVELAND 14, OHIO

NEW CONDUCTORS?

Naturally, you will want to spend only 2 to 3% of new conductor cost to eliminate vibration damage, clamp and tie damage, burning and slipping.

what's **New** in street lighting

A High-Efficiency Residential Optical Assembly for Modest Budgets



The Type RV optical assembly mounted on a Form 79 hood.

General Electric offers this new high-efficiency optical assembly for safe, attractive lighting of residential or light-traffic streets at a price even modest budgets can afford.

Efficient Light Distribution

Type RV optical assembly produces a long, narrow, two-beam distribution (IES Type I), making it excellent for very long spacing (10 to 12 times mounting height). Where the desired footcandle value is about 0.2 and economy of 4,000 or 6,000-lumen lamps is needed, the Type RV is the ideal choice.

The Type RV has a newly developed reflector which directs light down into a new Holophane VERTILATERAL refractor, specially designed to turn and lift light into a carefully controlled, long, rectangular pattern.

This luminaire has been designed for Comfortable Seeing. It has deep shielding and sharp cut-off above angles of maximum candlepower for less glare—excellent side shielding to keep the light down on the road where it's wanted—a rectangular pattern of light for long economical spacing.

Flexibility

And the Type RV fits in with standardization programs. It can be mounted on any Form 79 or 101 hood. The glassware can be spun-sealed to the reflector or assembled by clamp band or roller latch. For complete information write *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

With factories in Anaheim, Los Angeles, Oakland Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

GENERAL ELECTRIC

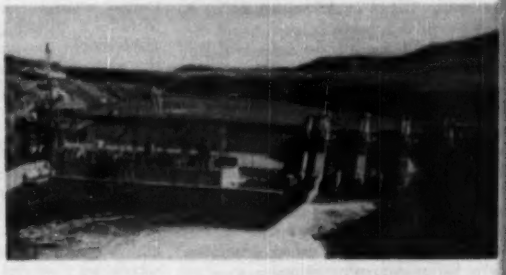
453-80

NOVEMBER 1950 Vol. 105, No. 5

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Virtually all of the Snake River Valley was desert before irrigation turned it into a veritable garden and helped build a billion-dollar empire



Fertile soil, a long growing season and water produce bumper crops. Idaho Power Co. has built five hydro plants since 1946 as one phase of

Valley Development By Private Enterprise

T. E. Roach*

President, Idaho Power Co.

Here is the story of the Snake River Valley where venture enterprise in the form of a utility company has worked with farmers, government, irrigation districts and industry to transform a desert into a prosperous and thriving community.

Southern Idaho and eastern Oregon —the territory served by the Idaho Power Co.—covers an area some 500 miles in length. It is an arid country volcanic in origin, possessed for that reason of a highly productive soil and an abundance of sunshine, two of the very important ingredients for a successful agricultural venture. The only thing required to turn that desert sagebrush land into magic productive acres is the application of water. Through southern Idaho for a distance of approximately 700 miles flows the Snake River, a tributary of the Columbia. It rises high in the Teton Mountains above Jackson Lake and follows its course through southern Idaho clear across to the Oregon boundary and finally down into famous Hell's canyon.

Because a major part of the Snake River's course is through the territory served by Idaho Power, it does present within the service area of one company a potential integrated river development. The actual development of this region has caused it to be cited as a dramatic example of river development by venture enterprise. The region has been publicized as one wherein the development of the natural resources of a river area has been attained by the cooperative effort of individual enterprise and the public without the overpowering supervision of a federally created, politically dominated river development agency.

Idaho Power Co.'s part in that development program began over 30 years ago, thanks to the vision, the courage and the foresight of predecessor managements. They were far-seeing, courageous men who believed in a policy of enlightened selfishness, feeling that anything sound which was good for the territory was bound to be good for Idaho Power. With that pur-

* Based upon an address before the Rocky Mountain Electrical League, Colorado Springs, Oct. 11, 1950.

pose ever before them, they have over the years actively participated in and become a part of every movement of a sound character intended to develop the economy of the area, enrich its residents and make greater opportunities for its young folks.

Importance of Water

Because water is so precious in Idaho, because the Snake River is the principal source of that water, and further because Idaho Power still occupies the unique position of being one of the very few 100% hydroelectric generating companies of the country, it was essential to the welfare of the area that power development did not interfere with the availability of water for irrigation. In the early 1920's it became evident that the water storage then available would not be adequate for a full year's water supply for the acreage then under cultivation in southern Idaho. Our company happened to own several water rights on the Snake River at American Falls. It also owned a substantial portion of the land available for a large reservoir site. As a result of negotiations with the irrigators in the area, the Bureau of Reclamation, Idaho Power gave up some of its water rights as well as a portion of the reservoir land in order that the irrigators downstream might have an adequate supply of water. In return it obtained certain contract rights permitting the company to use irrigation waters released at American Falls for power generation.

That arrangement was most satisfactorily carried through to the great benefit of the area and ultimately to the benefit of the company. In 1934 it was found that additional acreage brought in necessitated further water-saving steps in order that the late season irrigation might not suffer. So an amendment to our contract with the Bureau of Reclamation was worked out called the Water Saving Contract of 1934. Under that contract we gave up the right to the winter use of a portion of our own water in the American Falls reservoir in order that it might be held in storage for the next season's irrigation use. In return for this and for the transmission of bureau energy from its Black Canyon and Diversion power plants to various bureau points of irrigation pumping, and for the making up of certain power deficiencies of the bureau at its Minidoka power plant, Idaho Power Co. was permitted to draw on whatever surplus dump energy might be available from the bureau's various small plants. In this contract, covering the supply of supplemental power to the bureau for use on the Minidoka project, the company agrees to furnish the bureau up to 4,000 kw. during the summer irrigation months, April to September inclusive, with an additional 3,500 kw. for breakdown purposes only. The company further agrees to furnish up to a maximum of 10,000 kw. of winter power to the bureau for use on the Minidoka project including that to supply the needs of its town and rural people on the project. Our willingness to furnish up to 10,000 kw. of power, if necessary, during the winter months and to furnish 4,000 kw. of summer power together with 3,500 kw. of breakdown power, made possible a growing power income accruing to the irrigation district to reduce the cost of irrigation, or, in the final analysis, to help pay for the cost of the project. The irrigators profited additionally because of winter water stored for their benefit. We benefited by having a small amount of excess power from the Black Canyon power plant of the bureau at times on the west end of our power system, although this was only dump energy, and therefore not very dependable. We have at times also obtained some surplus energy from the Minidoka power plant. The federal government profited by being saved the cost of building transmission facilities from its plants to various pumping projects.

Support Sound Irrigation Projects

For 30 years Idaho Power Co.'s policy throughout its service area has been this: We strongly support all sound and practicable irrigation projects to which we give not only vocal support but energetic effort as well. We have a standing commitment with the Bureau of Reclamation that we will buy all surplus power that may result from generation as an incidence of irrigation projects at a price equivalent to that which it would cost us to go out and supply the facilities for power of similar kind and quantity. For over 30 years we have enjoyed the finest of cooperative relationships with the regional office of the U. S. Bureau of Reclamation in carrying out this policy. This has enabled the bureau to devote its attention to its fundamental assignment, which is to get more land under cultivation on a sound basis and to get families settled on the land. That such policy over the past has been sound and successful is best demonstrated when I tell you that in southern Idaho today we have about 2,200,000 acres of land under cultivation. Out of the total irrigation facilities provided in this area by the Bureau of Reclamation, the irrigators who are the recipients of the water and the benefits of the reclamation projects have paid back to the federal government over 96% of the money due to date on the total invested in those facilities.

Irrigated farmland is a keystone of the economy of the Snake River Valley which extends from north and east of Pocatello across southern Idaho and on into eastern Oregon. Throughout all of the Snake River Valley's relatively short history as a major agricultural area we have endeavored to associate ourselves in a constructive and aggressive way with all things which are for the good of the farm population. We have aggressively pioneered the introduction of sprinkler irrigation, using wells as a source of water where gravity flow water was not available.

For the benefit of the farm population we have carried on a very active farm chemurgy program, including basic research at the College of Idaho at Caldwell and the University of Idaho at Moscow under the sponsorship of Idaho Power. As the result of this farm chemurgy program and research projects, Idaho today is one of the foremost producers of potato starch. Waste material in the form of cull potatoes is converted into starches and potato sugars for use in food products, filler for paper and textile materials and many other uses. It was Idaho Power Co. investment capital that built the first practical working starch plant. When it was successfully in operation, Idaho Power withdrew and sold its interest to local people. Today there are about five of these starch plants operating in southern Idaho producing from $1,500,000 to $1.750,000 of annual revenue out of what had previously been a waste product.

Farm Electrification Program

We likewise have carried on for the benefit of the farm population an aggressive promotion of farm electrification, so that today electric service is available to 99% of the farm population in southern Idaho. This service is available to the farmers at exactly the same rates paid by residents in our largest city of Boise. The feeling of our urban and industrial population is this: The key to southern Idaho's prosperity is a sound, successful, profitable agriculture, and our urban customers are in agreement that the cost of electric power to the farmer should properly be as advantageous as that enjoyed by urban dwellers.

Now a "one-type" economy would be poor business for any area, and would not represent full and complete development of the resources of the area. Because we recognize that to be true, we have devoted much time and effort to bringing about a balanced and well-diversified economy. Our area has large stands of fine timber which is being processed and marketed in the form of lumber of all descriptions. Much has been done to develop within

our area many small wood fabricating establishments to convert timber products into many forms of prefabricated items.

Mineral Resources Development

Idaho is also a state of many mineral resources, and to the best of our ability we have made it possible for those resources to be developed. We have encouraged this development by making low-cost electric power available in the remotest sections of mountainous Idaho so that no sound mining or mineral processing venture could say that electric power was either inadequate or not available. Thus the federal government cannot possibly make the claim that it must come into our area because the local utility has been unable to meet these demands.

As a result of all this we have in southern Idaho and eastern Oregon a very tangible demonstration that valley development can and does go ahead on a sound, aggressive and profitable basis under the stimulus of venture capital and without the domination of the federal government.

Power Needs Increased

As the economy of Idaho has developed, so too has the need for more power resources. Between 1943 and the present time our growth in peak load in southern Idaho has been greater percentage-wise than any other operating utility in the Pacific Northwest interconnected power pool, not excluding the Bonneville system. This growth has come from expansion of the agricultural industry, from new food processing establishments of all descriptions, and from new mining and mineral processing developments. Discovery of rich tungsten deposits north of Boise during the last war created an industry which supplied over 50% of the country's tungsten requirements. Following in the path of tungsten development came the discovery of large deposits of antimony in the same area of Idaho. Today 95% of the antimony supply of the United States comes from this operation. The latest industrial development in our area is one in a very fast-growing chemical industry. We have in southeastern Idaho the largest remaining deposit of high-grade phosphate rock in the United States. The high-grade rock is used in the manufacture of commercial fertilizer. The low-grade shale which overlays the high-grade rock, up until a year and a half ago, was a waste product and a burden on the cost of recovering the high-grade rock. The advent of synthetic soaps and detergents created a new and profitable market for this low-grade shale in the form of elemental phosphorous that is produced by burning the shale in an electric furnace.

Thanks to an adequate supply of low-cost power we have operating in southeastern Idaho today the first two electric furnaces for the processing of phosphate shale west of the Mississippi River. In addition we have contracted to supply two more furnaces within the next eighteen months. The demand of each furnace and its auxiliaries approximates 20,000 kw. Four furnaces will require 80,000 kw. of power for this one installation. In January of 1944 our peak load was 80,000 kw. Today we are called upon to supply to just one customer a load equivalent to that of our system load of 1944. Last week the Utah Power & Light Co. and ourselves, under a joint venture arrangement, signed a long-term contract to furnish the power requirements of the new atomic reactor testing laboratory near Arco, Idaho. We don't yet know the ultimate requirements of this load—it may reach as much as 50,000 or 60,000 kw. Our immediate commitment is 20,000 kw.

Generating Capacity Tripled

Because of these unusual load increases we have found it necessary to triple our generating capacity in the past 3½ years. And today we are beginning work on another new hydro project which will add an additional 100,000 kw. to our system by the spring of 1952. Because of the aggressive activities of the three utilities making up the interconnected group of the eastern division of the Northwest Power Pool, there has been no shortage of power at any time in our area. They have not only supplied the heavily increased demands of their own areas but in addition, during the winter before last, Idaho, Utah and Montana jointly supplied to the power deficient Pacific Northwest states of Oregon and Washington as much as 100,000 kw. that being the maximum capacity of the interconnection between Montana and Washington. It was a strange situation indeed that the great area in which the federal government had taken major responsibility for power supply found it necessary to come to the Intermountain area and there draw upon the excess resources of private utilities, whose own ability to adequately serve the Intermountain area alone had been frequently questioned by government power advocates.

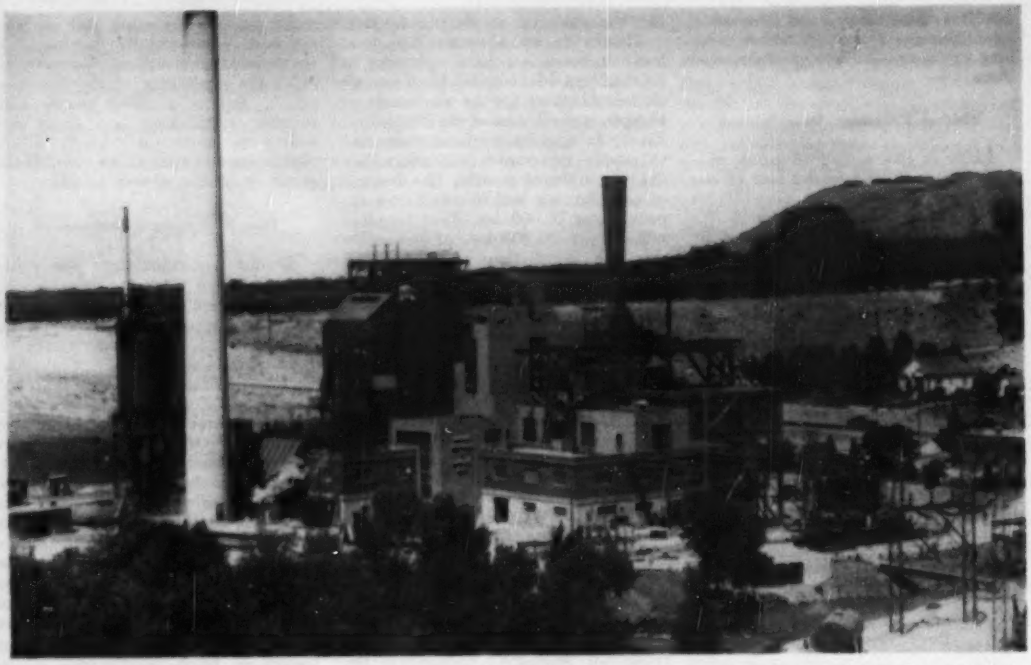
This experience probably offers the most telling contrast I can think of in highlighting the difference between private, energetic enterprise and the heavy, slow-moving hand of government in business. Ourselves, Utah Power & Light Co. and Montana Power were enabled to meet all the demands placed upon us because we are independent in our operation, are free to make our own decisions, and we have not been hampered by the blight of government competition. Moreover, we enjoy the confidence of the investing public, and as a result people with venture capital have been ready and willing to invest their funds in our companies and thus make possible the sound expansion of our facilities.

Fear Bureaucratic Domination

In our particular area our prime concern is not fear of valley authorities. We think the Columbia Valley Authority proposal is pretty much discredited in that part of the country.

The thing we fear most is the spread of bureaucratic domination through the exercise of the broad powers which federal bureaus have assumed by promulgating restrictive administrative regulations and through broad interpretations of the intent of preferential clauses in federal laws. We fear that more than anything else, because these bureaus can take arbitrary action which may be just as damaging to us as would be the case under a Columbia Valley Authority. Those of us who operate in public domain states are almost completely at the mercy of the Bureau of Land Management in the Department of Interior for rights-of-way across public lands. In furtherance of the effort to expand power distribution from federal projects there recently have been incorporated in the conditions and regulations under which easements must be accepted, requirements which make wheeling of federal power mandatory by utilities occupying public lands under such easements. We are regulated today more by administrative orders than we are by legislative enactment. An administrative regulation has all the force of law until it is challenged in court and its validity established. For that reason I think we should be extremely cautious about meekly accepting regulations which over the years may prove to be just as effective a weapon for putting us out of business or hampering our activities as would formal legislation.

Because of this trend to hampering administrative regulations, a great majority of the people in our area are convinced that the federal government is embarked upon a program of persecuting the industry in a determined effort to force public power into particular areas. Our job now in our territory, and I'm sure in others as well, is to prove to the man on the street and to the people we serve that our activities and our business are now, and always have been, in his interest and in the interest of the public generally, and that we can do a better and sounder job of supplying his electrical requirements than can any public agency.



Automatic quick load pick-up and electrostatic precipitation are features of new Hale 44-mw. coal-burning plant of Utah Power & Light Co.

Hale Plant Is Semioutdoor Type

Louis Elliott

Ebasco Services Inc., New York

Hale steam electric station recently completed at a cost of $7½ million is the first step in a $61 million system expansion program of Utah Power & Light Co. with headquarters in Salt Lake City. The plant is an extension of 18,700-kw. Orem steam plant, renamed the Hale plant in honor of J. A. Hale, the company's long-time vice-president and chief of operations. The plant is located at the entrance of Provo Canyon not far from the town of Provo, Utah.

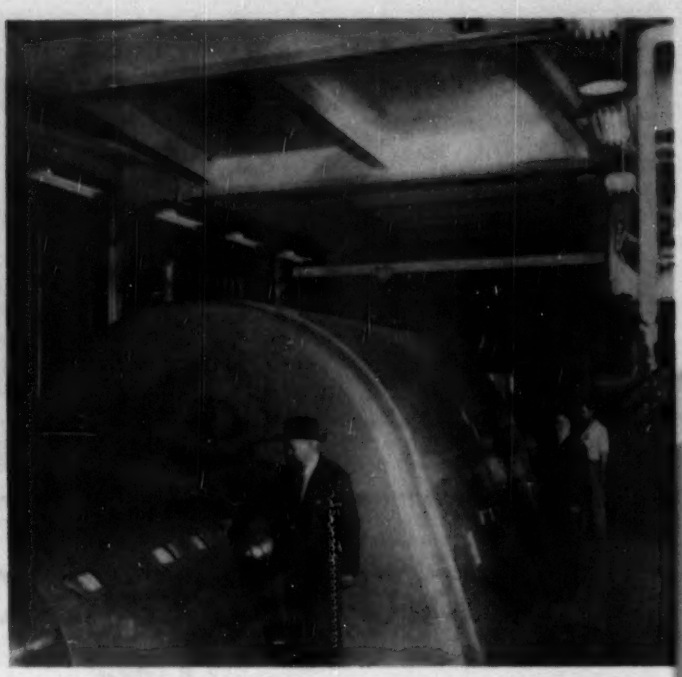
Semioutdoor type of construction was used for the new extension. It goes somewhat further in developing that type of construction than the original plant. The plant has outdoor boiler with firing aisle housed, and a low turbine room with gantry crane overhead. The control room is an enclosure between the turbine and the boiler. The boiler or steam generator is designed for a normal maximum generation of 450,000 lb. of steam per hour. Pulverized coal is supplied to the furnace by four mills. Mechanical dust separator and electrostatic precipitator are provided for the steam generator in order to obviate any nuisance resulting from stack discharge. The turbine unit is a 40/44-mw., 850-psig., 900°F. preferred standard.

Steam conditions of 850 psig., 900° F. were selected, taking into consideration expectable cost of coal delivered and load factor, over a period of years. For a station connected to a large hydroelectric system it is difficult to predict average annual load factor. The necessity for low load and somewhat irregular operation over certain periods favored steam conditions that would make such operation practicable. The economy at about 49,000 kw. is estimated at 11,660 B.t.u. per kwh. Indications are that this figure will be met and improved upon.

The site is advantageous in that foundations are excellent, and adequate condensing water is available from the Provo River. The intake is on an irrigation canal running close by, permitting a minimum of investment for condensing-water works. Water temperature in the river is below 70°F. most of the time. The flow of the Provo River may at times fall below the demands for condensing purposes of the extended Hale plant. For this reason provision is made for recirculation of a part of the water required for the older unit. This is economical because of the low temperature of the river water.

Good coal is obtained by rail from the Carbon County fields, the freight rate to the plant being lower than to Salt Lake City. The location is also good from the transmission viewpoint, for a plant of moderate size.

The plant is connected to the company's transmission system which serves a load of about 250,000 kw. supplied in large measure by hydroelectric plants, and with interconnecting lines running to Idaho and Montana. To meet these conditions, design of the new unit is such that it can run for long periods at a load as low as 10% of turbine capacity—about 5,000 kw. —and be brought up to full load within a very few minutes. During this standby operation, the boiler is gen-



Ash collected in silos (left) is hauled away by rail. Roof hatches in low generator structure (right) permit maintenance by gantry crane

erating about 50,000 lb. of steam per hour, the turbine being controlled by a governor load-limit device; one pulverizer and two burners are utilized, and if necessary two pilot oil burners. If system frequency should drop below 58 cycles, the 5,000-kw. load limit is automatically removed and a second load limit is put into operation; this latter can be set for any value desired —perhaps 30 mw. during light-load periods and 50 mw. at time of high loads. There is also a low-pressure controller on the turbine, which prevents it from taking a load larger than that corresponding to steam available from the boiler while maintaining at least 800-psig. pressure at the throttle. The single mill in service can carry a turbine output up to 15,000 kw. Supplementary oil fuel is available as required. As the load comes up, additional oil burners are lighted off and as soon as practicable additional coal pulverizers are started. Oil fuel is later replaced by coal.

The elevation of the Hale plant is about 4,500 ft., and during the winter, snow and low temperatures are experienced. Provisions are made to minimize troubles that may be experienced by this semioutdoor plant during severe cold and storms.

The story of electric power development in Utah reaches back into the early days of the power industry. A brief review will serve as a background leading up to the foregoing account of the new Hale plant extension. L. L. and P. N. Nunn organized, before the beginning of the century, a company designated as Telluride Power Co. for the purpose of making hydroelectric developments in Colorado, Utah and Idaho. L. L. Nunn interested himself in young men, assisting them to obtain a theoretical and practical training in engineering subjects. A technical school was founded in Utah—the Telluride Institute—for preparatory training, and a number of the young men were sent to Cornell at the expense of Mr. Nunn. This school, housed in a substantial brick building, was located adjacent to a small hydroelectric plant in a park-like area about 40 miles south from Salt Lake City. Telluride Power Co. made, prior to 1905, several small hydroelectric developments interconnected with each other and with market areas by means of 44-kv. lines—a pioneer undertaking for that time. In 1907 it built on the Bear River in southeastern Idaho an 11,000-kw. hydroelectric plant with 44-kv. transmission extending 130 miles to Salt Lake City.

The next important power development in Utah was the construction in 1913 and 1914, by the newly formed Utah Power & Light Co. of a chain of hydroelectric stations on the Bear River, between Bear Lake in southeastern Idaho and Great Salt Lake. These stations utilized nearly two-thirds of the 1,500-ft. drop between those two bodies of water, and made use of Bear Lake as a huge seasonal storage—holding when full the equivalent of over a billion kwh. This power and transmission development pioneered in adopting 132,000 volts. Power was transmitted 130 miles to Salt Lake City, and for the first time on a large scale making use of outdoor-type transformers and circuit breakers of that voltage. Present capacity of this chain of Bear River plants is about 125,000 kw.

The original Orem steam-electric station, built in 1936 at the mouth of Provo canyon and forerunner of the present Hale plant, also constituted pioneering, in utilizing the outdoor type of station. That plant had a 15/18.75-mw. turbine and stoker-fired boiler. The turbine-generator was housed in a relatively low structure with roof hatches, permitting handling of turbine parts by a gantry crane. The boiler was placed outdoors.

When it was found in the late 1940's that additional steam-power capability would be required by the company, it was decided to extend Orem. Following this came the decision to build the Hale extension described.

Ebasco Services Inc. rendered engineering and construction services to this extension to the Hale plant, as for the original installation.

Two inches of clear ice formed on wires in record sleet storm. Poles equivalent to 65 miles of line went down. Storm cost PUD $500,000

LESSONS FROM 1950 STORM DAMAGE

F. H. Lehman*
Clark County PUD, Vancouver, Wash.

On Jan. 18, 1950, the Clark County Public Utility District at Vancouver, Wash., experienced the worst ice and sleet storm on record in the county. Two inches of clear ice formed around conductors on about 700 miles of the district's 1,100 miles of distribution lines. The storm took down 1,170 poles (enough poles to build 65 miles of line); 1,220 spans of wire, and an estimated 3,500 services. Service to an estimated 20,000 of the district's 28,000 customers was interrupted at one time or another. Only one 12-kv. feeder remained in service in Vancouver. It carried 15,000 kva. It was necessary for the district to borrow $500,000 to repair the damage. That was the severity of the storm.

Weaknesses in automatic equipment showed up. It was necessary to replace 11 transmissions, 23 clutches, 4 axles and 8 rear ends. Approximately 140 sets of chains and three gunny sacks of repair links were used. This gives some idea of the wear and tear on automotive equipment. It shows the importance of heavy-duty equipment and is an indication of spare parts that must be carried.

Line Construction Weaknesses

It is quite impossible to build lines that will stand up under such severe ice loadings. Nevertheless, the storm showed up vulnerable points to be watched in building distribution lines to minimize damage. The following observations were made:

The majority of poles failing under the severe test of ice load were those that had an average life expectancy of ten years or less. However, a number of recently set raw cedar poles were broken. Comparison proved that tank-treated fir poles were the least affected. Only in isolated cases did breakage of the latter type poles occur, and then the point of break was invariably above ground level. The cause of the failure in these cases was exposure to extreme stresses.

An important factor contributing to the collapse of distribution lines was inadequate guying of open telephone leads on joint poles. It became quite obvious that the various rural telephone companies' present practice of using planks for anchors or, as in some cases, securing their down guys to the district's anchors provides insufficient strength to the installation.

A survey of the damage sustained showed that particular attention should be paid to the following points:

1. Poles. Do not stub corner poles, angle poles or transformer poles. Keep these key poles in perfect state of repair.

2. Guying. The ratio H/L on down guys should never exceed the value 2:1.

3. Conductor.

a. Pay close attention to the correct sagging of conductors during construction. The importance of this point became very obvious under heavy loading conditions. There seems to be a definite tendency for most linemen to string wire of the smaller sizes too tight.

b. Use compression-type splicing sleeves whenever possible. A large number of automatic splicing sleeves failed under the severe test. Their use should be confined to hot-line work.

c. Slack spans should not exceed a length of 80 feet. Two inches of radial thickness of ice on No. 6 HDBC results in a tension of approximately 1,000 lb. per conductor on a 300-ft. span.

4. Service Drops. Intermediate service poles should be installed on all services exceeding a length of 120 ft. The point of support at the house should be carefully selected to avoid the house knobs pulling loose as a result of heavy ice loading. All heavy and long services should be guyed.

5. Trees. Falling trees and branches

*Adapted from presentation before Northwest Public Power meeting, Portland, Ore., Sept. 15-16, 1950.

were the largest contributing factor to the damage sustained by the district's distribution system. All danger trees should be removed or topped whenever possible; all overhanging limbs should be trimmed.

Prior to the storm the district had had an extensive tree trimming program in operation. Observations showed that this tree trimming definitely paid dividends. A large part of this trimming had been performed along approximately 100 miles of line that had been converted from 2,400 volts to 7,200/12,450 Y. These lines had been rebuilt as a part of a conversion program. The major part of the storm repair work on these lines was confined to splicing of broken conductors as most of the bad poles had been replaced. It is interesting to note that, except for some breakages of No. 8 solid copperweld wire, no breakages occurred on larger sizes of copperweld conductor. There is only a single break of ACSR on record. This was the result of a large tree dropping across the line.

This outline would not be complete without mentioning the invaluable help that our shortwave radio gave us during the emergency. With 65 crews working on the system, switching and energizing of lines would have been a very slow and even dangerous undertaking. None of the rural telephone lines were in operation and radio was the only means of communication.

The telephone system in the city of Vancouver was not affected too much by the storm. This was because the larger part of the system is cabled. This resulted in a large number of calls by customers anxious to have service restored. It turned out to be a full time job for five to six employees to answer these calls courteously. The press and radio were informed daily of the progress that was being made in order to keep the public well informed. In addition, all the district's personnel was being kept well acquainted with what went on. This made possible answering customers' questions intelligently. As a result of being made familiar with the situation, with few exceptions the public was very patient and cooperative.

In an emergency like the one described, it is necessary to have a considerable number of men available who are both familiar with the system and the utility's practices. This point becomes particularly important when outside help such as contractors have to be called upon. The whole experience brought out the importance of anticipating storms, of being prepared with good and sufficient equipment and of having well built and well maintained lines and equipment.

Notes on Pole Maintenance

Systematic pole testing and follow-up maintenance every five years will keep pole plant in good shape*

Robert D. Hoffman
Seattle City Light

Cedar poles that are butt-treated have, in Western Washington, a life span of between 20 and 25 years. The principal cause of deterioration is rotting at the ground line and shell rot which occurs above the ground. Poles often show decay before the normal 20- to 25-year period because of unusual soil bacteria or from being eaten by ants or termites.

Pole Testing

A systematic project of pole testing is very desirable, covering all poles every five years. A bar made from ¾-in. hexagon steel 42 in. long, with a knob 1½ in. in diameter on one end and a 3-in. taper to a point on the other is used for probing at the ground line of poles. In testing for decay, the first probing should be done at the largest cracks in the pole. Care should be taken on butt-treated poles to avoid damaging the treatment by probing.

A field book record of poles showing location, number, height, crossarms, transformers and guys is desirable. In rural areas records can be made of individual pole lines, and in urban areas, of quarter sections or sections, depending on the concentration of poles. The condition of the pole at the ground line is recorded by diameter in inches. The original diameter and the net diameter are recorded, i.e., 14 in.-12 in., indicating one inch of decay, or 14 in.-H, indicating the original diameter was 14 in. and that the pole is hollow. In considering net diameters in testing, careful observation is necessary since the bar may not penetrate enough to give true conditions because the summer growth of the annular ring does not decay as fast as the softer spring growth.

Stubbing

Stubbing poles when practical is more desirable than cutting off and lowering, because of ground clearances of lines and services. Generally stubbing is only done in rural areas, since a stubbed pole is quite unsightly in residential and downtown areas.

Pole crews should know the original diameter of the pole to be stubbed so that the stub diameter will match the pole to be stubbed. Stubbing should be done on the road or field side of the pole rather than on the face or back to prevent twisting the stubbing bands. Pole stubbing costs are approximately one-third the cost of pole replacement up to 50-ft. or 60-ft. poles, not including the additional cost of transferring equipment.

Pole Replacement

The following conditions may indicate need for pole replacement:

1. Pole top decayed, indicating pole, arms, and braces unsafe.
2. Crossarm split.
3. Pins pulled out of crossarm.
4. Surface of pole decayed, making climbing hazardous.
5. Condition of pole at ground line.

The following table offers a guide for replacing decayed poles.

Replacement Guide

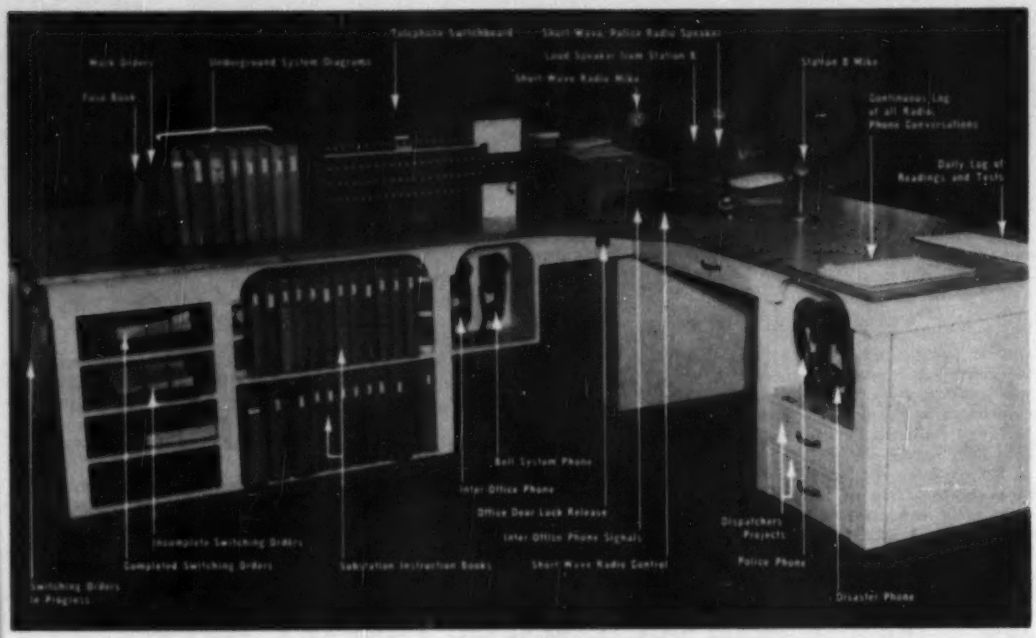
Original Butt Dia.	A-net In.	B-net In.
30	15	20
26	13	16
22	11	14
18	10	12
16	9	10
14	8	9
12	7	8

A-net: Minimum diameter for individual replacement.

B-net: Minimum diameter for area replacement.

A combination of the above conditions may indicate immediate replacement is needed. Long leads of poles with few services should be guyed with sway guys to prevent line failures that may occur when repairs are more costly than normal. Corner poles or angle poles that are guyed will allow more decay before replacing.

*Presentation before Northwest Public Power Assn., Portland, Sept. 13-15, 1950.



SYSTEM DISPATCHING GOES MODERN

E. M. Foster

Chief Dispatcher, San Diego Gas & Electric Co.

The new system dispatchers' office of the San Diego Gas & Electric Co. was designed to accommodate future expansion for many years, and to provide the best operating conditions by having soft tones and soft colors. A new location was necessary to increase the floor space from 1,200 to 2,500 sq. ft. This was to provide space for increasing the number of supervisory controlled substations from eight to thirteen and for doubling dispatchers' desk space from two to four positions. In addition, separate offices for the clerk and chief dispatcher were provided. Six of the controlled stations had both transmission and distribution facilities. During the moving these controls were split and more panels added. Transmission substations having 69 kv. and higher voltages are grouped together in one-half of the large semicircle; panels for controlling the distribution stations with 12 kv. and lower voltages comprise the other half. For some of the smaller stations controls for two stations are located on one panel. There is a total of 28 panels, 18 for supervisory control and two for instruments.

Company personnel designed and constructed the two T-shaped desks illustrated. They were made according to specifications of the dispatchers and embody features found desirable from years of experience. The top of the T of each desk faces the supervisory control panels so that the dispatchers at the transmission desk monitor their section of the board and the distribution dispatchers monitor their stations. Open shelves below the desk surface provide ample space for instruction books, load records, log books, switching orders, etc., along the sides of the T between the dispatchers' positions. A removable vertical panel opposite the dispatchers provides access to a communications terminal compartment to permit servicing and changes to be made without disturbing the desk occupant. There is one spare desk position fully equipped for use in emergencies when another dispatcher is needed.

A complement of 12 men comprise the dispatching crew. Activities of the system dispatcher consist mainly of ordering in switching to clear or put in service lines and equipment; issue clearances and accept their release; control the voltage and reactive power; arrange the interchange of power between this and other systems; compile load data; assemble and keep up all data pertaining to the system that is needed for operation and expedite the restoration of service when outages occur. For this year the number of switching orders per week has averaged 626.

Synchronous selector-type supervisory control was used on all the original units. All of the new units installed during the recent expansion are of the code selector type. Functions of the units are, in addition to control and indication of oil circuit breakers and disconnects, changing taps on seven TCUL transformers to control voltage and reactive; control of voltage on one generator; provide selective telemeter-

ing for voltage, megawatts and vars, and to give alarm indication for transformer temperatures, pressures, oil levels, differential relay action, pilot wire failures, bus potential failure and 125-volt d-c relay trip voltage failure. A total of 217 OCBs and 18 sets of disconnects are supervisory controlled. All of these functions plus phone communications are now handled by using two pairs of wires, whereas on the older installation nine pairs were used.

Both torque balance and frequency telemetering equipment is used. Stations controlled are from 1 to 20 miles in distance and both leased wires and company-owned circuits are used. An electrical interlock is provided to prevent both transmission and distribution panels from being operated at the same time where one supervisory unit is used for this duel purpose on one station. Terminal facilities for the control cables are located at the rear of the supervisory control board in metal cabinets mounted on the wall.

Communication facilities consist of four direct Bell system telephone lines to each of five desk positions, six Bell system lines through the company PBX board to each of six desk positions, 28 company-owned lines to stations and key personnel, and carrier for fire desks operated from either of two switchboards in the dispatchers' office. There is also one direct phone line to the San Diego disaster headquarters and one to the police department dispatcher's office. All of the hand sets for phones are in recessed compartments below the desk surfaces, as shown. Multikey boxes are semiflush mounted in the desk surface. Each of the four regular dispatcher desk positions has an operating key for the radio transmitter. There is a microphone on a swinging boom between each pair of desk positions so that each is shared by two dispatchers. The transmitter is located on Mt. Soledad, eleven airline miles from the office and is remotely controlled by a pair of leased wires.

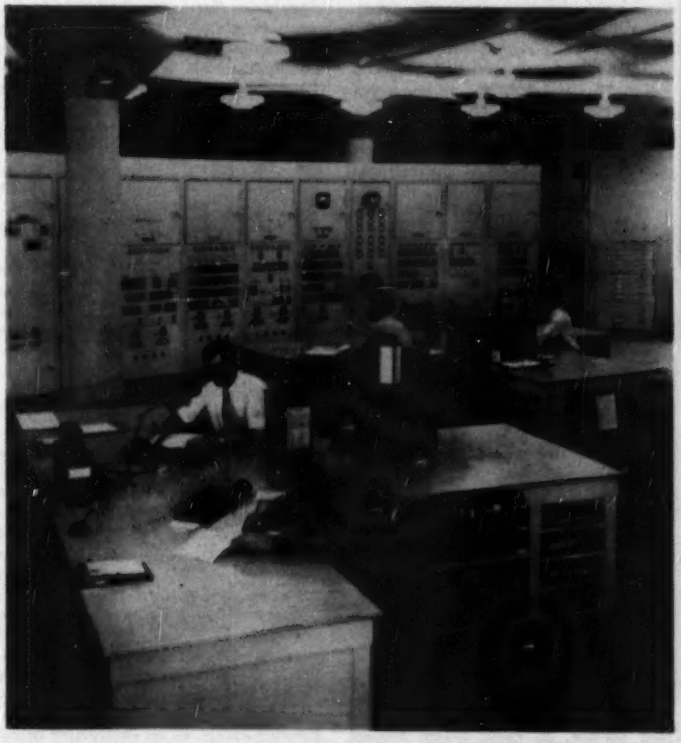
In case of failure on this transmitter there is an emergency set available in the office that can be switched in service immediately by the dispatcher. Both sets are rated at 50 watts by the manufacturer. In addition to two sources of power to operate the radio there is also provision for a portable gasoline-engine generator to be connected in event of a complete power failure. Operating frequency is 153.71 megacycles. There are 48 two-way radio equipped cars in the field which includes all trouble cars. Transmitters are equipped with modulation limiters.

Two additional radio receivers are used—one to monitor police and fire calls for possible damage to company equipment and the other to receive time signals or monitor any frequency desired. On each desk there is a small console with two speakers and volume control. A loud speaker intercom that may be turned on during emergency operating conditions is connected between the dispatchers office and the control room for the generating station which is the headquarters of the electric production department.

The system diagram is 9 ft. high, 23 ft. long and is constructed of 1-in. thick tempered masonite. It is schematic, indicating transmission lines and stations with color-coded lines for the different voltages. Colored-coded plugs are inserted in holes to indicate any abnormal condition enabling the dispatcher to determine at a glance the operating setup of the system at any time. Japan colors soluble in turpentine are used on a gray lacquer base so that changes in the diagram may be made without affecting the base color. On one side of the system diagram is a 9x13-ft. street map of the metropolitan area, showing high-voltage lines and the districts fed by each circuit. On the other side is a 7x9-ft. section map of the entire area served with 12-kv. and higher voltage lines shown.

The lighting has proven very satisfactory. It consists of eighteen 500-watt lamps in concentric ring indirect lighting fixtures. Similar fixtures are used in the adjoining office of the clerk and chief dispatcher. On the horizontal surfaces of the desks there is a light intensity of 40 f-c. The vertical control panels have 25 f-c. With the base color of the walls, furniture, and panels being a glareless light gray, the desk and table tops being covered with a special desk top linoleum in mist green color, and the floor a similar gray colored asphalt tile, there is little chance for fatigue due to eye strain.

Two sources of a-c power are available for lighting. In case of a total power failure two battery-fed lights are turned on automatically. Batteries for communications, lamps and supervisory control are located in a separately enclosed and ventilated adjacent room. Facilities are also available to connect a gas-engine-driven generator for lighting. The ventilating system consists of a manually controlled blower pulling in outside air from the north side of the building through a dry-type filter and forcing it through ducts to grills with adjustable vertical and horizontal vanes. Acoustical board covers the ceiling. Electric hot plates, toilet and washroom are conveniently located in adjacent rooms.



These two T-shaped desks were designed and constructed by company personnel for new office

Oil Circuit Breaker Maintenance*

A preventive maintenance program for care of oil circuit breakers should include systematic inspection and care. It will insure:

1. **Fewer service outages**
2. **Dependability of operation**
3. **Lower Maintenance costs**
4. **Maximum breaker life**
5. **Safety of operation**

Daniel J. Copps
Bonneville Power Administration

Safe and successful functioning of connected apparatus depends upon the proper operation of the oil circuit breaker. Whether it is a large 230-kv. high-speed reclosing installation or a small service restorer in a low-voltage feeder circuit, the breaker must have systematic care and inspection. Assuming that an oil circuit breaker of suitable rating and characteristics has been selected for an application, maximum life and satisfactory service will be obtained if a schedule of preventive maintenance is planned and executed.

This schedule should indicate frequent visual inspections, never less frequently than once each week or once each shift where practical in attended stations. It is important to be alert in observing any changes in the conditions of bushings, the oil level in the breaker tanks and the appearance of the oil in the oil gages. The presence of carbon or discoloration of the oil may indicate that a severe fault current has been interrupted and that the contacts require immediate attention. An increase of the tank temperature detectable by touch may occur in the smaller breakers indicating a loose connection in the current-carrying parts or poor contact surfaces. Any abnormal conditions observed during inspections should be thoroughly investigated and corrected at the earliest opportunity to avert serious trouble and failure of equipment. To make repairs required as a result of trouble is not sufficient. The cause of the trouble must be determined and corrected in a truly preventive maintenance program.

Operating tests should be made at regular intervals where by-pass switches are provided and testing can be done without interrupting important service. In cases where by-pass switches are not provided, the decision of foregoing the operating tests in favor of continuous service should be carefully weighed however; because frequently tests will disclose a condition that if adjusted immediately will prevent a subsequent failure of the breaker with the resulting unscheduled outage and costly repairs. The operating test consists of simply opening the oil circuit breaker, opening and closing in turn, the associated disconnecting switches and then closing the breaker to restore normal service. The operation is usually performed by the station operator once each month and is observed by a competent maintenance electrician or electrician foreman. If the switches have been operated for normal switching purposes during the month, the operation test is not considered necessary.

Dielectric strength of the oil should be tested at frequent intervals to assure a satisfactory insulation level. The interval between these tests depends upon the service that the breaker has performed. Once each three months is generally recommended under normal conditions. Manufacturers' instruction books and bulletins give instructions on methods of obtaining oil samples and making tests. These instructions should be followed literally to avoid contamination of the oil sample and to be sure that a true test is obtained. If the dielectric strength is found below 16,500 volts when tested in a standard cup, the oil should be filtered. It is also advisable to drain the tanks and make a general inspection of the equipment even though the normal interval since the last general overhaul has not elapsed. Reconditioning of the oil by circulating it through a filter press with the breaker energized can be done. This is not recommended except as an emergency measure pending the time an outage can be obtained to clean the tanks and determine the cause of the contamination.

The operating mechanism, a vital part of the oil circuit breaker, requires in most cases, adjustments to close tolerances to obtain satisfactory operation of the main contacts. A thorough cleaning and careful inspection of this part of the equipment is required at least four times each year. The manufacturers' recommendations regarding adjustments and lubrication must be followed carefully. Generally speaking, the mechanism should be lubricated sparingly. In all cases excess oil and grease must be removed because of its tendency to collect dust. Cleanliness is an important factor in the maintenance of oil circuit breakers as well as in other types of electrical equipment and cannot be stressed too strongly. A clean piece of equipment is easily inspected and seldom fails in performing its normal function.

A general overhaul of the oil circuit breaker should be made at regular scheduled intervals determined by operating experience and the manufacturers' recommendations. On the Bonneville Power Administration system it is scheduled for once each two-year period after the first and second inspections following installation. A new breaker is given a complete inspection twice during the first eighteen months operation; first, at six months and second, at eighteen months after which, if there are no abnormal conditions, it is placed on the regular biannual schedule. If a breaker has interrupted a severe fault that is near its full rated capacity, it is overhauled immediately following the open-close operation. In any case an overhaul is made after five automatic interruptions.

The general overhaul requires from twelve to sixteen hours outage time on the larger breakers. It includes a thorough cleaning of all insulating parts. The contacts are inspected for alignment and pressure and the necessary corrections and adjustments are made to meet the manufacturers' specifications. Sliding or slip-type contacts and the arcing contacts are smoothed with a file to remove any particularly rough projections that might cause an improper operation. Renewal of this type of contacts is required in the normal course of events. High-pressure butt contacts are not dressed because the

* Presentation before Northwest Public Power Assn., Portland, Sept. 13-15, 1950.

current-carrying capacity of this type is practically independent of the condition of the contact surfaces. If they reach an intolerable condition, they are renewed by welding and machining or they are replaced by new ones. The bushings are carefully inspected for damage and each gasketed joint is examined for the possibility of moisture entering the breaker.

It should be recognized that a routine overhaul is made for the purpose of replacing worn parts, correcting adjustments and for general servicing of the equipment. In other words, it is the intent to maintain the breaker in its original condition in order to obtain trouble-free operation and avoid unscheduled interruptions because of equipment failure. No minor detail should be overlooked. Very recently, during the course of overhauling a breaker, a small valve in one of the pistons that forces oil through the contacts was found broken and out of place. With the breaker in that condition it could not have performed its normal function of satisfactorily interrupting a fault current. Had a fault occurred, a serious disturbance or system breakdown might have resulted.

Simultaneous operation of the three poles of the breaker is important because of complex relaying schemes and protective circuits. The required condition is usually accomplished by adjusting the relative position between the stationary and moving contacts to specified measurements and then checking with lamps connected to a battery in series with the contacts. By operating the breaker slowly and watching the lights closely, a satisfactory adjustment can be obtained. When the speed requirements are critical, or if, during the course of an overhaul, adjustments have been made that may have affected the speed of the operation, a timing test is made with a circuit breaker operation analyzer and corrections made as required.

In the case of 230-kv. high-speed breakers the tolerances are much closer than in the lower voltage breakers. In such cases an oscillogram is made of the operation of the contacts breaking a low d-c current. From this, a close adjustment within one quarter cycle, can be made. An oscillogram of the "as left" condition is filed for future reference.

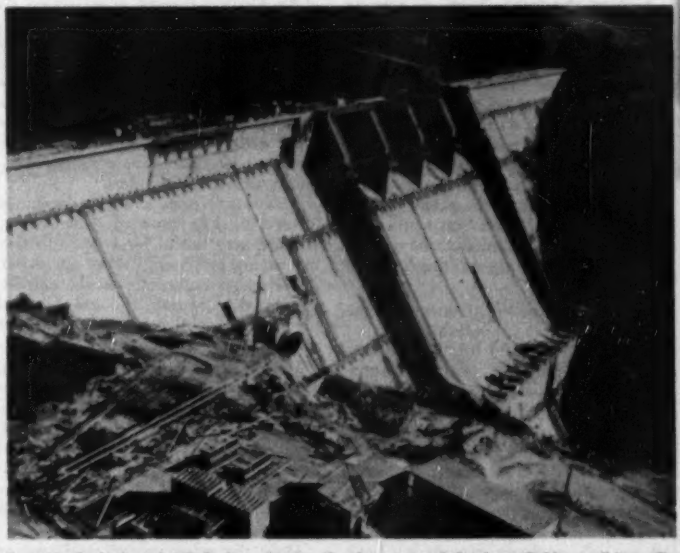
Accidents will occasionally happen to equipment regardless of the care exercised in adhering to a rigid maintenance schedule. Parts become broken from faulty material or poor workmanship; relay coils and operating coils fail in service; contacts are sometimes destroyed by a severe interrupting duty that was unforeseen and bushings become damaged by lightning or other external hazards. To assure continuity of service to the customer, replacement parts must be readily available. It is desirable to forecast as accurately as possible the requirements for these parts and material. The manufacturer usually makes recommendations for the minimum amounts that should be stocked. But the operator, however, is in a better position to make a final determination. The amount of money he wishes to invest, the importance of minimizing outage time because of breakdowns in operation and the distance from the source of supply and transportation facilities must be taken into consideration.

Items and quantities of major spare parts stocked by the BPA for use on a system-wide basis are determined by a committee of three. These are the superintendents responsible for maintenance of substations within their respective areas. A standard quantity is established for a given number of breakers of an identical type. This is based on the manufacturers' recommendations, the combined personal experience of the men responsible and BPA's policy as to the investment. Interchangeability of bushings between breakers of different manufacturers and in some cases between transformers and oil circuit breakers is also taken into consideration in determining quantities.

Maintenance of low-voltage series-trip service restorers used in some of the smaller outlying stations is generally performed in the shop. This procedure has been found advantageous because of the type of installation and the usual pole mounting of these breakers which makes them difficult to maintain in their installed position. For this reason, complete units are carried in the spare parts stock ready for installation when required.

Mention should be made of safety precautions followed when working on equipment installed in a service position. The equipment is first de-energized and a clearance is issued by the load dispatcher to the man directly in charge of the work to be performed. Grounds are placed at each point of possible source of power. In congested areas, energized equipment is roped off to prevent possible contact by the workmen. When the work is completed, the clearance is released to the load dispatcher by the same man to whom it was issued. A general rule to follow is to be sure that all sources of power, both high voltage and operating voltage are either disconnected or dead and that the high-voltage terminals of the breaker are grounded. When working on oil circuit breakers of the stored-energy or spring-operating type, the springs should be discharged before men are permitted to enter the tanks because of the hazards of the breaker being accidentally tripped.

All Bonneville Power Administration personnel are schooled in accident prevention and a code of safe practices. It is the responsibility of the foreman in charge of a job to be ever cautious for the safety of his men.



Dam 250 ft. high and 950 ft. long for Big Creek project of Southern California Edison Co. is complete except for spillway gates. Plant will have two 42,000-kw. units. Completion is scheduled for mid-1951. The Bechtel Corp. and Morrison-Knudsen are general contractors

Why not give your customers a multitude of push button services, such as yard and garage lights operated when they cross a rubber tube as they drive in the yard—

You Can Do It With Relays

says

Howard E. Dudrey

Dudrey Electric Co., Provo, Utah

George Eastman built a fortune with his inexpensive Brownie camera, because he introduced a hobby to the American people. Recall the hobby of "roll your own" radio that launched the radio industry of today. It seems to me that relay wiring, with the unlimited supply of relays now available, and the unlimited possibilities of what you can do with them, holds more promise and allure than any hobby ever promoted. Relays can bring true the dreams of the public for a half century of running a push-button household.

For the contractor it seems to me that relay wiring holds promise of much more. It could lift the business up out of the class of cheap price competition onto a plane of engineering more and still more conveniences and electrical aids for customers.

Let's just consider some of the wonderful possibilities of relay systems for the home and think of the chance to sell these to a customer instead of just a minimum wiring job. If *wiring* is all we sell, anybody can do it. Let's look at some of the *services* we could sell and provide through use of relays.

An electrical relay is a device by means of which a very feeble or simple electrical impulse can control one or more electrical circuits. Within this definition there are hundreds of variations in number of contacts, in number of windings, instant operation, delayed action, ratchet and counting relays, as well as electronic relays, commonly called radio tubes.

Relays are now available designed for mounting in standard switch boxes, and are very useful for adapting existing wiring systems to relay operation. Three major makes are on the market, Touchplate, Square D, and General Electric. Doubtless there will be others.

In designing a relay wiring system a much more flexible arrangement consists of mounting a comprehensive relay cabinet adjacent to the circuit breaker or fused panels and connected to them by means of ducts, with multiconductor cable running from this cabinet to each of the switchboxes and other points for convenient control.

Once the relay cabinet and two or three hundred feet of cable have been installed, one pair of wires in this cable can be used for telephone jacks at all convenient points in the house, garage, etc. Thus an extension telephone instrument can be plugged in at a moment's notice.

Other wires in this cable can be used for burglar, fire alarm or other signal circuits, for radio speaker extensions and intercommunicating phones.

The power used for relay operation need not be more than 24 volts, either a-c or d-c, and since the current is limited to a few milliamperes the rules for installation are very simple. Article 725 of the National Electrical Code permits such latitude because even on short circuit no hazard is created in wires or transformer.

Where an emergency lighting system is wanted, if electric service interruptions are rare and of short duration, an excellent relay system can be had by using 24-volt direct current supplied by four automobile storage batteries, charged by a trickle charger. This capacity will be sufficient for minimum emergency lighting as well as for relay operation.

If multicontact relays are used for the regular lighting circuits, then a single floating relay will transfer the lighting from the regular supply at the instant of power interruption, the same push buttons being used for lighting as in regular operation, but the power that can be switched on is kept within the capacity of the storage battery. If electric clocks are wired to a separate circuit, a converter may be installed so that they will be kept going during the interruption of power supply.

The function of the door bell push button need not be limited to ringing the bell or sounding the chimes. With the addition of a time delay relay it can energize the entrance lights and an intercommunicating phone set between the front door and the kitchen or bedrooms.

In addition to the front door lock, the strike plate may be replaced with an electric door lock which, in addition to operation from convenient points within the house by means of simple push-button action, can also be operated from the outside by means of a telephone dial and ratchet relays so that a key is unnecessary. Few people think of it in that light but there are almost as many electrical combination locks as there are mechanical combination locks, since that is exactly what the dial telephone is. Using the dial lock on the front door no one need go out to get the paper some wintry morning and find himself locked out, clad only in pajamas and slippers.

One arrangement of relays and timer that I have myself made up into a

compact unit which I call Drivlite is an assembly of relays by means of which a single momentary contact turns on the lights and starts a timer that turns them off in approximately five minutes with a single timer, or ten minutes with two timers. Its commonest applications are to light the porch light by pressing the doorbell button, or to light the driveway by driving over a piece of rubber hose in the driveway.

The simpler arrangement, shown in the smaller schematic diagram, consists of a very small 120/24-volt transformer, two G-E or Square D relays, a thermal time-delay relay with 120-volt heater, a two-filament lamp, a G-E or Square D switch and an Edwards four-contact push button. The transformer and relays are assembled in the canopy of the porch light fixture. To install this fixture in a conventionally wired home we short out the single-pole porch light switch and run a three-conductor relay control line to the bell push and relay switch. For the driveway two PAR lamps are preferable to the two filament lamp.

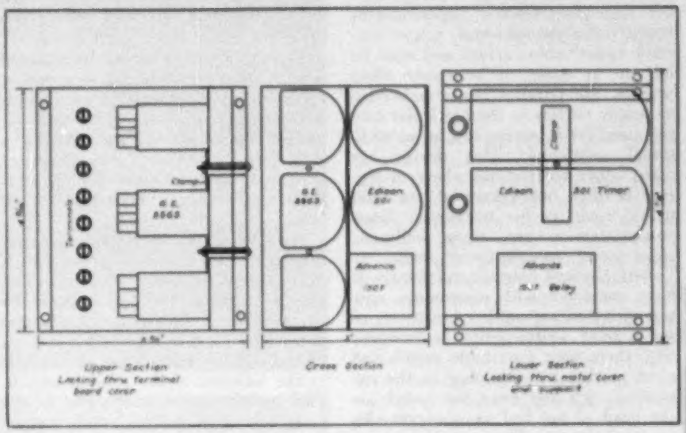
This simpler assembly will be quite satisfactory in most applications where traffic is not heavy, but it has two limitations. One, cannot readily remove control from outside points and yet keep the lights on or off as desired. Secondly, the timer contacts open slowly, which gives it a hangover effect of several seconds. It requires five minutes cooling before it will again give full timing.

In the complete assembly, shown in the larger diagram, the relay at the right, controlling current to the lamp or load, is not in this assembly, but is located in the outlet box which it controls. The rest of the assembly operates on 24 volts, designated by terminals 5 and 6.

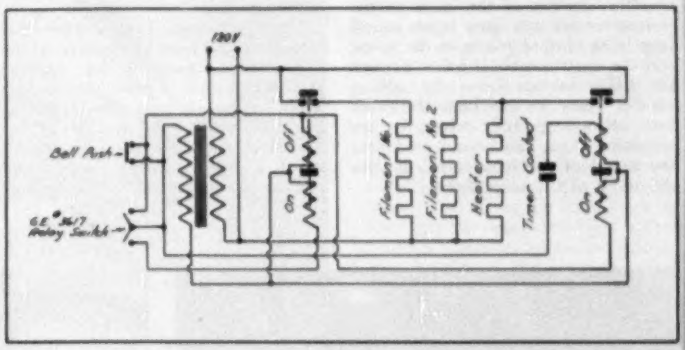
The impulse coming in from the outside button or rubber tube is split into three parts by the first relay. One latches out any succeeding impulse until the timing period has elapsed. The second turns on the first timer, and the third turns on the light. The contacts of the first timer turn off the current to its heater, and then current on to the heater of the second timer. The contacts of the second timer turn off the current to its heater, turn off the light and close the latching relay to receive another impulse.

Since one timer cools while the other is heating, this assembly will repeat immediately for approximately full timing. If one of the outside buttons were shorted, the light would burn continuously with a flicker at the end of each interval. By pressing the latch button in the proper time sequence the outside buttons may be

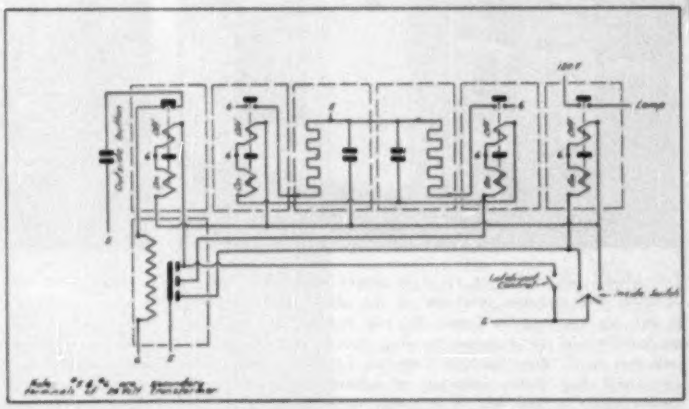
How Relays and Timers are Arranged



Above diagrams showing the arrangement of various parts into a compact enclosure



Wiring diagram for Drivlite with single timer for simple operation of lights on an interval



Schematic for unit which gives control of lights both inside and outside the house

latched out with the light either on or off.

Drivlite is not recommended for direct control of a garage door operator but since photoelectric, supersonic or tuned radio garage door relays consume appreciable current and must be left on in order to be ready when needed, the Drivlite is recommended to supply current to the particular control used for economy and as an additional safeguard. This device has many other applications wherever current is often negligently left on after using, such as for occasional intercommunication sets, long hallways, store rooms, process timing, etc.

Both General Electric and Square D have come out with momentary contact switches but neither has given us yet a relay switch outlet to combine with them with a portable switch and cord so that we can plug in the extension cord and hang the switch on the head of the bed or wherever else we may choose. These could be used either on lighting control circuits or on the circuit controlling the radio set.

By operating our radio by means of relays instead of the knob on the instrument we can turn it on or off from a number of points in the house and the control cable supplies circuits for additional speakers. By adding another relay we can have the radio turn off automatically whenever the telephone rings, thus avoid confusing the sound of the telephone bell with the script of the soap opera.

If we happen to have a radio-phonograph combination capable of recording broadcasts we can add relays so that it will answer the telephone and record the calls that may have come while we were away.

The old alarm clock can be replaced with a program clock that one cannot forget to wind. It can be set to ring only on the five days of the week on which you work. Having canceled a call from it, you need not remember to turn it back on again for the next morning because it does that for itself.

In each of the remote control systems there is a so-called master switch using a multicontact selector switch for the purpose. The G-E is manually operated while the Square D is motor operated. In each of these cases all of the control wires must be brought to the location of the selector switch. This greatly increases the cost of the relay wiring. The same result may be accomplished with one or more multicontact relays located at points central to the otherwise existing relay wires, similar to the method used in the Drivlite assembly.

Electric ranges have temperature control on the oven but vessels on the top elements have to be watched against boiling over with the same vigilance as the old open fire. There is no good reason why we should not have a thermometer for each burner which, inserted into the vessel, could prevent the temperature of its contents from exceeding any predetermined point desired. This can be accomplished with a relay in the circuit.

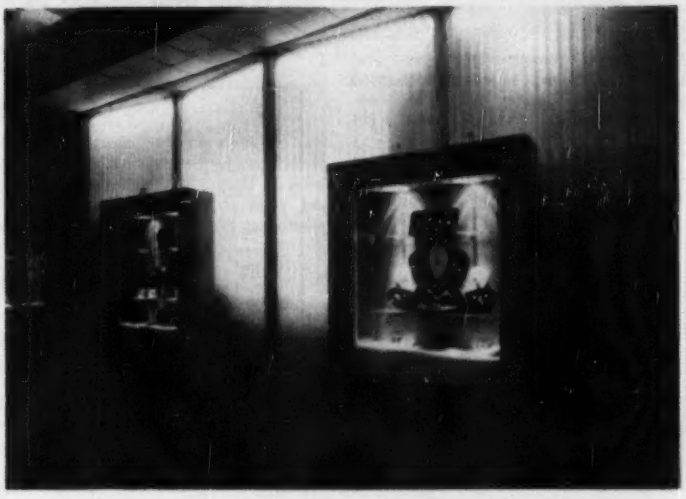
The rectifier previously mentioned for charging emergency lighting storage batteries can be so designed that it may also be used to saturate the core of a saturable reactor, which may be inserted into the circuit of any convenient outlet desired. This would give stepless control of the current from it. Such an outlet might be used at the bedside outlet for control of temperature of a heating pad, bottle warmer, or in the projector room for special lighting control.

Such a rectifier can also be used to control the field strength of a general utility motor, the armature current of which is obtained from end cell connections to the emergency lighting storage battery. This will give us a motor of very wide speed range, largely eliminating the need for reduction gears.

All of these advantages and possibilities and many more are available without additional wiring if the cabinet and control cable are installed at the time of roughing in the regular wiring job.

George Eastman did it alone. This, however, is something the whole industry can cooperate upon. We need only to introduce a light metal relay cabinet and a piece of braided telephone cable to get this started. It is a certainty we can put it over if we do not all sit back and let George do it.

THE STORY OF LIGHT—In all of its phases, commercial, school, industrial and domestic, was one of the most popular exhibits at the big Los Angeles County Fair, at Pomona, recently, and the exhibit was so designed by Ray Fischer and his display staff that H. C. Rice, Southern California Edison Co. sales manager, and Roy Dahlin, director of lighting, and their men can transport it and use it at other fairs. Space does not permit pictures here of the other displays; they will be pictured later. But here is a replica of the G-E Lighting Institute's lighting recipe demonstration room. With Touchplate low-voltage control switches, attendants in charge could readily demonstrate to the 200,000 who visited what the valance and wall bracket strip, the floor and table CLM lamps, the dining alcove fixture, the down lights over the desk, the luminous panels in the bookcases each and all looked like in contrast to a single bare and glaring lamp in the center of the room



LIGHTING a Jewel Box

When a pioneer jewelry and optical firm in Walla Walla modernized, it called in Brandt Gessel, Seattle architect and designer, who made the 50-year-old Martin's as modern as the newest on Fifth Ave. or Wilshire in Beverly Hills. The long, narrow store, divided for jewelry and optical departments, is a veritable glowing jewel box from its concentrated small display windows, set in a black glass front that rises two stories high, to every detail of its interior. As a lighting installation it is unusual yet none of it is obvious.

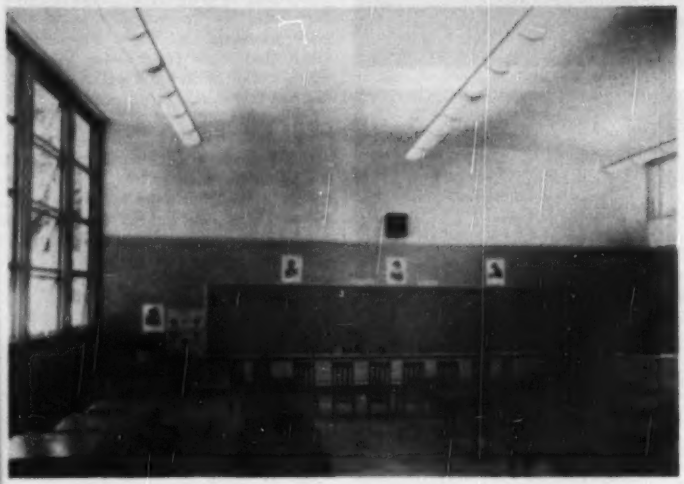
A louverall ceiling over the entrance, lighted from above with fluorescent lamps, extends over the set-in front to come flush with the building front. Show cases are lighted by reflector lamps either back of a row of louvers along the front or in ornamental cone fixtures along the sides.

The louver is carried down the length of the counters, which for eye appeal are set at slight angles. Above this louver in a black painted dropped ceiling, are mounted reflector spots to punch specular light down on the counters but from an angle not to reflect into the customer's eyes. A cove in which slimline lamps are hidden lights the side of the dropped ceiling and the acoustical main ceiling. Reflector spots in swivel cone mountings are placed over the front door for dramatic night effects, and along a rear side shelf area.

The shadow boxes back of the counters are lighted from a ripple glass covered troffer over the top, and louvers cut in the Masonite side walls of each shadow box admit extra light from a tubular Zeon source concealed there.

The ribbed structural glass partition between the jewelry and optical departments is made luminous by a row of slimline lamps along the top. Display shadow boxes set in this are lighted from above by louvered units.

Another feature not illustrated here is a curved glassware and crockery case which has not only light down through its glass shelves from above but up from the bottom through an opal glass floor to the case. At a small desk at which to write checks a flush ceiling unit, switched conveniently, floods the table with light. Installation was made by Electric Home Service Co.



Lighting Saves the Trees

When the grade school in Ross, Marin County, Calif., was built about ten years ago, it was of advanced design, the forerunner of the school planned to utilize daylighting to best advantage. Carl F. Growme, San Rafael architect who designed it, realized that full utilization of daylight would be possible only when many of the trees closely surrounding the site could be removed.

But, it developed that the trees were under control of the town council rather than the school board, and the council represented a community which is as notable for its conservatism as it is for its unusual charm. To many of the old-timers the trees, which furnished much of that charm, were more important than "new-fangled frills in school lighting" for the benefit of children and teachers.

The controversy dragged out, and for years the school was underlighted even artificially since Growme had considered daylight as a principal light source.

J. E. Barnes, illumination engineer of Pacific Gas and Electric Co., was instrumental in enlisting the endorsement of Architect Growme, Principal P. M. Bliss and the school board in improving the seeing conditions by utilizing fluorescent lights to replace the inadequate incandescent in the original section and in a new addition of four classrooms and multiservice rooms. Lighting specifications for the addition, by that time under construction, called for a low-cost type.

The issue was put squarely up to the board. It would have to go to the expense of relighting the school if the trees could not be cut. C. T. Bakeman, illuminating engineer, was handed the problem—how to light the entire building, new and old sections, with modern luminous indirect fluorescent equipment at no greater cost than the equipment specified for the addition.

The desired lighting was in line with a study made in early 1948 by the Department of School House Planning, State of California, D. Earley, assistant to the director, in cooperation with John Walsh of PG and E, in which both daylight and artificial light sources had been scrutinized from original cost, to installation, to performance and maintenance. The luminous indirect type was the one that met all requirements. Bakeman first recommended continuous rows of Wakefield indirect Star units (four-lamp slimline type). With these a saving in labor of $15 per spot where an outlet was *not* required was made because of the continuous rows. One big recreational room had been overloaded (50 f-c) in comparison with actual lighting needs in that particular area. The load was reduced in order to build up more important smaller classroom areas from low lighting levels to about 40 f-c.

With cooperation which started with the architect and continued through the power company, the suppliers Graybar Electric Co., the school principal and board and the contractor, Jack Cimino, Cimino Electric Co. of San Rafael and San Francisco, the sacred trees were saved along with the children's eyesight and general health.

Six months after installation, the illumination values and reflection factors were surveyed with results shown on the table reproduced here. Principal Bliss reports that the equipment is cleaned only at the end of summer vacation and at Christmas vacation, "with lighting levels excellently maintained."

FRONT

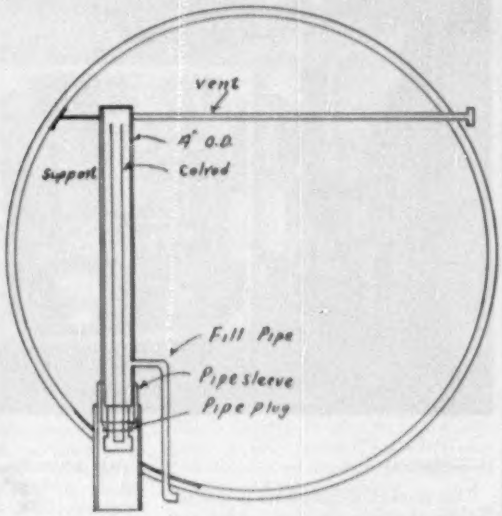
Full windows				Clerestory windows
	85	70	69	
	53	41	41	
	92	84	73	
	55	46	43	
	89	83	75	
	54	45	46	

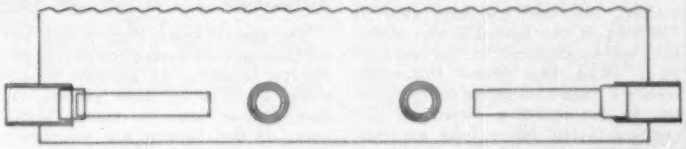
Illumination Values—6 months after installation. Upper figure is for footcandles with lights on; lower figure is for daylight only

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 73

SUBJECT: Road Oil Heating
CUSTOMER: Washington State Highway Dept., Union Gap, Wash.
TYPE OF BUSINESS: Highway Patching and Construction
SERVICE COMPANY: Pacific Power & Light Co.
DATA PREPARED BY: E. B. Allard





Electrically heated road oil tank showing placement of 5-kw heaters. Saving is $664 per season

Description

Road oil is received from heated tank cars. Oil must be kept at 150°F or brought up to this temperature for road patching work. New work requires that the oil be heated to 240°. A 10,000-gal. tank is used.

Old Method

This job was formerly done by use of rented steam tanker heaters. Rental was $50 per heat-up period. Labor cost per heat-up was $60. Time required was about 48 hours per heat-up.

New Method

Four 5-kw. calrod immersion heaters having an over-all length of 46 in., installed in 4-in. pipes, were inserted into the storage tank. These pipes are kept filled with SAE 50 motor oil. A vent at each end of the pipe is provided as indicated in the accompanying drawing. Heaters are operated by a thermostatically controlled magnetic contactor. Heaters operate at 240 volts, single phase. Tank insulation consists of 3 in. of spun glass covered by sheets of aluminum.

Advantages

A saving of $664 per season was made. Cost of heat under the old method of operation was approximately $1,200 per eight-month season. The same job is done electrically for $536.07. During the 1949 season, 80,000 gal. of oil were used. There were eight heat-ups at 150° for patching and four at 240° for new work. The old system required advance notice of oil requirements because the steam did not keep the oil up to the required temperature of 150°. With electric heating the oil is maintained at 150° ready for immediate use. When 250° oil is required the thermostat setting is raised at the end of a day shift. The hotter oil is then ready the next morning. No discharge pipe heating is required since the tank is mounted on concrete pedestals high enough for the truck to drive under it.

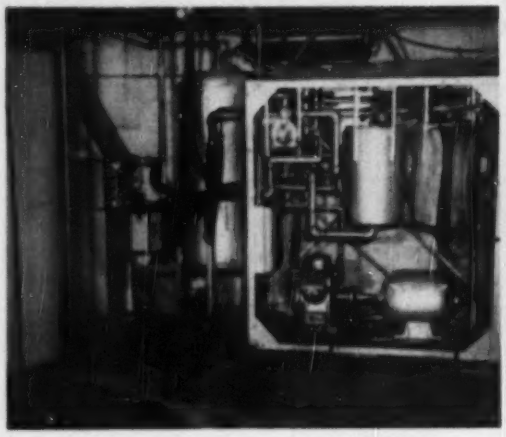
Operating Data

Connected load, 20 kw.; demand 20 kw.; total kwh., 28,930 per season; gal. per kwh., 2.7; cost per gal., 5c.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 74

SUBJECT: Electric Space Heating
Electric Water Heating
CUSTOMER: Wagners Coffee Shop, Twin Falls, Idaho
TYPE OF BUSINESS: Drive-In Restaurant
SERVICE COMPANY: Idaho Power Co.
DATA PREPARED BY: Parris E. Kail



Description

This all-electric restaurant is unique. Besides complete electric cooking and water heating facilities, the entire kitchen, cafe and bar with area of 2,615 sq. ft. are heated in the winter and air conditioned in the summer by a 10-hp. heat pump. Hot water coils are embedded in the ceiling plaster. In the winter a forced air circulating system blows fresh air over a set of heating coils furnished with hot water from the heat pump. In the summer the air is forced over refrigerated coils served by the heat pump. Well water is utilized as the heat source and for circulating 52° water through the ceiling coils in the summer.

The heat pump is of sufficient capacity to furnish 120° water to a 100-gal. electric water heater for cooking and dishwashing. Since the electric water heater has to raise the temperature of the incoming water only from 120° to 180°, a 100-gal. tank is sufficient for all hot water needs. During the summer months when the cold water is forced through the radiant ceiling coils, sufficient heat is absorbed from the air to supply the water heater with 120° water when the system is on the cooling cycle. The system is completely automatic, changing from heating to cooling cycle as temperature demands.

Advantages

The electric space heating and water heating systems are completely automatic requiring no attention to operate. There is no flame present, no soot, dirt, or ashes to remove. Moreover, all fire hazards are completely eliminated.

Operating Data

The entire consumption is billed on a one-meter rate. Average monthly consumption for the past six months has been 20,320 kwh. per month. Average 15-minute monthly billing demand has been 51 kw. A check meter on the 10-hp. heat pump motor for the period, November 1949 to April 1950, showed the average monthly consumption to be 3,911 kwh. with a demand of 8.3 kw.

Electric Equipment

	Wattage Connected
Roll warmer	1,000
Ranges	16,000
Waffle iron	2,000
Coffee maker	3,000
Toaster	2,450
Bun toaster	1,200
Food table	4,000
2 Fry kettles	11,300
Griddle	4,500
Bake oven—3-deck Ranier	18,000
Dishwasher	4,000
Meat saw—2 mixers Meat slicer Meat grinder Potato peeler Ice cream machine	2,000
Refrigeration	8,000
Fountain Walkin 2 Beverage cooler Water cooler 2 Reach in refrigerators 2 R E F	
Lighting (exterior)	4,000
Lighting (interior)	5,600
Water heater	5,000
Heat pump motor 240-volt, 3-phase	10 hp.
Circulating pump	1/3 h.p.
Well pump	1 hp.
Total watts	101,700

Paul Geary, Don Clayton, A. V. Bartlett, President Vanderlinde, R. Osborn, J. D. O'Connor, C. Harder, W. E. Frazier, O. Burnett

NECA SWITCHES TO BUSINESS

A change of emphasis from that on labor to one on management and business development, begun at last year's Houston convention, went farther at the 49th convention of National Electrical Contractors Assn., at the Biltmore, Los Angeles, Oct. 16-20, attended by 915 delegates, their wives and staff. In fact, labor was conspicuously absent, as the IBEW was itself holding convention the same week, at Miami.

Instead, with the exception of one full day's closed sessions devoted to the many aspects of contractors' relations with labor, NECA heard from its customers and its other associates in business, the utility, general contractor, and manufacturer. NECA's mounting interest in training for more efficient management, both of the job and the business, and a program to sell the contractors' services to the public rather than only bid for it, dominated for a welcome change. And the "old guard" again gave way to "new blood" in election of district vice-presidents.

President Edward Vanderlinde, Rochester contractor, presided with warmth, humanness and oft repeated appreciation of the vast amount of work done by NECA's staff.

J. D. O'Connor of Sacramento, District 6 vice-president, presided over many of the sessions and Ed Buttner, Oakland, acted as labor relations committee chairman in the absence of E. C. Carlson, Youngstown, perennial chairman. Nor was Past-president Robert McChesney of Washington, D. C., present. Wheelhorse A. Lincoln Bush, articulate champion of the New York City contractors and their president, withdrew from the threatened contest for his seat as District 1 vice-president. His chapter had had him read a threat to withdraw from NECA if the amendment passed requiring all traveling contractors to take membership in chapters in whose area they do work. Although the amendment, the only one over which there was heat, polled a majority of 1,404 to 1,169, 235 votes, it failed to get the required two-thirds. Bush's withdrawal left Alfred V. Bartlett Sr. of Providence, unopposed for District 1 vice-president. When Leon Granger of Hammond, Ind., who had been run last year to beat Norman Pierce of Chicago, also withdrew, Oliver Barnett Jr. of Chicago, a customer-service-minded contractor, was added to the administrative committee as District 4 vice-president.

Other significant and important "materials and labor" estimates of the convention are briefed on the next two pages' "takeoff sheet" in a way any contractor can understand. The totals add up to a good job, with lots to profit the contractor.

District 8 caucus on 19th amendment—V. P. Collier, Krummel, Morroni, Larson, Fehr, Strohminger, Price and the Simpsons

Seattle's Larry Gattavara, F. T. Holert, John A. Carlson, Don W. Close and Puget Sound Chapter Manager John Majerus

DISTRICT 8 was well represented. A few of its members were caught by the camera. At top of page, Rocky Mountain Chapter songsters, A. J. Marroni and Don Larson, chapter manager. Ralph Johnson, new district vice-president, shown at the left. UTAH CHAPTER sent J. E. and N. W. Forsberg, Robert Swaner of Salt Lake City, and L. A. Herdti, of Ogden, among many others. MORE from that chapter included R. E. Bartlett, Salt Lake City; Joe Gilgan of Caldwell, Idaho; A. R. Woolley, Pocatello, Idaho, and Utah Chapter manager, G. A. Howarth, Salt Lake City. SAN FRANCISCO's delegation included NECA Past President Clyde L. Chamblin (1927-29), W. T. Kennedy, San Francisco association president; W. J. Varley, chapter executive manager, and Pat Furlong, member of the board of directors. Hosts to the convention in 1947, San Francisco had a large representation

TAKEOFF SCHEDULE

of actions and events of material interest

Dues

All amendments to change dues were defeated, but the committee studying dues was told to bring in recommendations next year for any needed changes.

Officers

Ralph Johnson, Sturgeon Electric, Denver, was unopposed for either vice-presidency of District 8 or its labor relations committeeman, succeeding Everett Collier.

Gypsies

While the amendment, to require traveling contractors to take membership in local chapters while doing work in their areas, failed to get two-thirds majority, the vote warned the gypsies to make peace with local chapters and also cautioned chapters not to make it too tough.

Government affairs and restrictions

Instead of working for corrective legislation NECA has to defend against drastic restrictions and damaging bureaucratic agencies. Resolution was passed changing policy to favor separate bidding in which bidder and bid is stipulated and award made either by separate contract or included in general contract with fee to general contractor. Resolution called on federal government to let its construction and modernization contracts on lump-sum basis, using existing specialty organizations, getting experienced job management, giving priorities for the full job and permitting the contractor to furnish materials.

Credit control on housing

Took steps to ask immediate relaxation of credit controls on multifamily dwellings that would provide middle- and low-income wage earners with dwellings. Regulation X is aggravating housing shortage and causes unemployment and distress in the construction industry.

Trade practices

The fair trade practice rules obtained from Federal Trade Commission in 1931 are ignored because no machinery for enforcement was ever set up. Authority was voted to confer with FTC to make any changes needed or apply for another conference. Then make compliance a condition of membership in NECA.

Codes

Paid tribute to George Andrae of Milwaukee, the contractors' representative on the National Electrical Code, as he retires from that service.

Research and training

Announced appointment of E. R. "Al" Cornish, Western field director to new post of director of research and training, headquartered in Washington, D. C. NECA will soon launch a management and technical personnel training course to help solve the problems of accounting, sales engineering, estimating, job management and business administration under Cornish.

Outside viewpoint

"As Others See Us" brought outside viewpoints and many excellent suggestions—E. F. Luna, Anaconda Wire & Cable, showed how the "Power Up and be Prepared" program can be used to increase business; Robert Ginna, Rochester Gas & Electric, urged NECA to reopen associate memberships to utilities and the industry and join in all-industry programs; C. B. Tibbetts, Los Angeles Steel Casting Co., advised contractors to study their customer's process needs and make themselves part of his organization in serving him; Merle Smith, T & S Construction Engineers, said, "If you can't trust the general contractor with your bid, don't give him one."

AN ESTIMATE

of NECA's over-all job at L.A. convention

Labor relations

Contractors cannot match IBEW's economic strength but can improve their bargaining position through NECA organization. There are still too many localities in which contractors have not placed themselves in position to benefit from NECA's negotiating experience and help and its standing at top level with IBEW officers who value NECA cooperation and pension contributions.

Council on Industrial Relations

More than an arbitration board, is a court for labor and management. Its technique and representation improved, its decisions should be accepted with sportsmanship.

Jurisdiction

Agencies have been set up to handle both intra-IBEW and IBEW vs other craft union jurisdictional fights. A contractor should keep out of all such himself, turn problems over to these joint boards to settle.

Line construction

Whether linemen's agreements are handled by the individual chapter or by a line constructors chapter, care is needed not to unbalance the scale and cause dissension between inside and outside wiremen. If NECA does not push organization of line chapters it may be faced with a competing organization for bargaining rights. Many problems of line construction go beyond the scope of local chapters; require an area organization if not a line chapter. R. C. Hughes of Spokane depicted the tremendous volume of line construction for government projects, REAs, and private utilities, and urged contractors to seek it.

Pensions

Contractors contributions to joint IBEW-NECA pension plan exceed IBEW contribution by over a million dollars thus provide a surplus for slack times and increase in number of pensioners. Employment had been slackening before Korea affair, is high now, but may sag again. Single national plan avoids hundreds of differing local plans, operates at only 6% cost. Plan to provide insurance and pensions for chapter managers and contractors' own staff turned down.

Vacations

Still on record officially opposing paid vacations, members heard report that 24 locals have put over a plan. IBEW holding its convention at Miami had vacations as one of its demands for everywhere.

Field staff

Cornish's going East will make Matt Sherwood the Western regional office director and an assistant field man is to be appointed. Geary said five regional offices are needed; at present two are at San Francisco and New York. Field staff to solicit ads for the association's magazine in addition to all other duties.

Business promotion

Time ran out before reports could be heard on NECA's business promotion program, and clipped Don Larson, manager, Rocky Mountain Chapter, too short to tell much about successful selling by that chapter of architects and the utility, but a separate story on it will come. NECA's program may be hurt by mobilization controls.

Prizes

Ralph Johnson of Denver won honorable mention for the estimating, and first place for the sales engineering contest but, as a member of the committee, turned back the prize. J. B. O'Neil, Scott Buttner Co., Oakland, won second prize for the accounting paper contest.

HOST CHAPTER, LOS ANGELES, is headed by Sidney Hill, president (top, left), and managed by Warren Penn, executive vice-president. Jack Rollins is his assistant. The entire board of directors and staff made up the active convention committee. FROM OREGON, S. I. Jagger, president of the Oregon-Columbia Chapter, and George B. Schotty, governor, Line Constructors. SAN DIEGO chapter manager, Pete Montgomery, congratulates Matt Sherwood, who will succeed E. R. Cornish as Western director. Tom Ford, president of San Diego Chapter, in the Texas hat. SPOKANE CHAPTER has an ardent worker in Les Stewart of Maxwell Electric, an energetic chapter manager, Bob Wilkinson. District 6 Vice-President J. D. O'Connor, of Sacramento, at the right, knows the area from work there during the last war. Each chapter in the district was well represented this year

GOVERNORS from District 6 chapters almost all here: Herb Evans, Los Angeles; Don Close, Puget Sound; Al Eddy, San Diego; R. Goold, San Joaquin; Don Bronson, No. Calif.; C. A. Wikle, Cal-Nev. Line Constructors; Charles Langlois, San Francisco; E. B. DeFoyter, Spokane; S. I. Jaggar, Oregon; J. D. O'Connor, district vice-president; George Schotty, NW Line Constructors. Others escaped

National Line Constructors members Bob Hughes, Spokane; Charles Simpson, Cheyenne

No. Cal. Chapter manager Ernest Kramm, Ed Buttner and Al Weber, all of Oakland

From farthest north, R. B. Grosscloss, Fairbanks, Alaska, with John Majerus, Seattle

A chance for some 55 contractors and chapter managers from District 6 states of Washington, Oregon, California, and Alaska to get together for a luncheon was provided by the NECA convention. Vice-President J. D. O'Connor, Sacramento, presided and told that the business promotion kits are now available to chapters for use.

The meeting also gave E. R. Cornish, Western region director who has just been promoted to director of research and training at the Washington headquarters, an opportunity to bid goodbye to the region which he has done so much to build to its present strength and activity. He said that by being in Washington the West would always have a champion there, one who, because of knowledge of the men and conditions in the West, could interpret their points of view at the national level.

Matt Sherwood, who will succeed him as Western director, and who had just completed a tour of the entire territory, pledged continuation of Cornish's constructive policies. O'Connor asked suggestions for another field man to work with Sherwood. Many from chapters in the Northwest asked that the new man be assigned to give more time to that area, possibly make his residence there. While this could not be promised, Cornish and Sherwood said that a schedule of travel would be worked out, barring emergencies, to give all parts of both Districts 6 and 8 oftener visits.

Other topics discussed included line contractor representation and the need to get the same commitment from the Department of Interior as to paying prevailing wages as had just been given by the REA. O'Connor asked all chapters and contractors to make known to him in ample time any problems they wished him as vice-president of the district to take up at the NECA administrative committee meetings. The next district meeting, he said, will be sometime in May.

V-p. Del O'Connor, and E. R. "Al" Cornish, who bade goodbye at a District 6 luncheon

Electric Club speaker Wm. C. Mullendore, SC Edison; A. L. Stone, convention chairman

Norm Ferguson, San Diego past president, and Ran F. Doll, Glendale, L.A. Chapter

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Dark horizon

By the time this reaches you the election will be over and a herd of new controls may burst out into the open like bulls at a rodeo. What they will be can be guessed to include more priority orders, controls on more kinds of construction, but not price controls—until the unions all have a chance to get another wage hike. The Oct. 26 ban on 40 kinds of construction for amusement purposes, on top of credit controls that have stopped house building, makes it rugged for small contractors. They face reducing their business to repairs, maintenance and small alterations or of closing shop to go to work for big contractors or the government.

Return

Copper and conduit for big jobs are already on next June delivery dates. Zinc restrictions may put black pipe back on the market, and steel demands even force non-metalic sheathed cable back in where wartime forced it before, local codes for metal notwithstanding.

Clipped

The Antitrust Division won a consent decree against the Eastern Electrical Wholesalers Assn. of New York, charged with forcing manufacturers to sell only to those it approved, and preventing direct sales to contractors, retailers, and consumers.

Assurances

In the contractor field there's no need for concern from an inventory standpoint, WESCO's president, John F. Myers, declared in San Francisco. Inventories have moved right out to the consumer level. Supply pipelines are cleaner than expected. Credit curbs haven't been felt yet, but undoubtedly will be soon. WESCO has felt the draft by losing trained personnel. Myers, out from New York, and John M. McKibbin, vp and gm of consumer products, Pittsburgh, surveyed dealer problems in major Western cities—Seattle, Portland, Salt Lake City, Los Angeles, San Diego, Phoenix, San Francisco, Dallas and El Paso.

Wholesale headaches

National Assn. of Electrical Distributors meeting at Coronado, (to be reported fully next issue) was the biggest ever, had most meaty program. Charles Pyle, managing director, assured wholesalers of better representation in Washington now than during the war. G. F. Hessler, Graybar's vp gsm, said the Korean success won't change things, it's an all-out mobilization now. For the first time 30 members of NAED board of governors came West for the meeting. Problems of the garrison economy and selling were discussed by national figures; Western utility men briefed them on the power situation. In the Northwest it is still bad. Elsewhere the capacity seems to be ample.

EMEA

Electrical Maintenance Engineers of So. Cal. have set March 15-17 for the next Industrial Electrical Exposition, at Shrine convention hall, Los Angeles.

Idaho group

Problems facing the small contractor will dominate the program of the Idaho State Electrical Contractors Assn., meeting at Boise, Nov 17-18. Held earlier than in the past two years, it will consider possible improvements to Idaho's electrical inspection law, government regulations on building, possible avenues for survival business, etc.

Washington too

Another independent contractors group, the Electrical Contractors Society of Washington will hold its annual fourth convention and social meeting at Seattle, Dec. 2, according to announcement by Ralph Neilson. Conditions facing the average contractor in present day affairs will be predominent in the discussions.

Next year

District 5, NECA has already set the dates for its annual meeting next year. It will be held at the Westward Ho Hotel, Phoenix, April 23, says George Seaman, NECA field director for the the district.

Tragic

William F. Kaiser, vice-president of Zinsco Electric Products Co. and manager of its Oakland plant, was killed when his car drove into the rear of a truck near Salinas, Oct. 19.

Ideas sought

W. M. Hogue. Larsen-Hogue Electric Co., is the new chairman of the Los Angeles Chapter of National Industrial Service Assn., the motor shop organization. Ray Smallcomb, Smallcomb Electric, is vice-chairman and Earl Sweinhart, Sweinhart Electric, secretary-treasurer. At the annual meeting the group heard about NPA from A. C. Wahlgren, U. S. Department of Commerce . . . NISA is carrying on a contest for shop ideas from motor shop employees, with prizes ranging from $10 to $100. Shop posters to invite participation are available from NISA.

Shot guns

Explosive powered tools have been the subject of controversy as to their hazards, some unions refusing to let their men use them. The Division of Industrial Safety of California has just issued standards which will be used as a basis for any special orders or ordinances relative to their use. The industry should not be denied their many advantages.

Idea book

Lighting Products, Inc. of Highland Park, Ill., has a new and attractive catalog entitled, "New Ideas in Fluorescent Lighting," available free, which includes everything from its single-lamp strips to a louverall called Panelux, in color. Distribution and other data are in it.

Bath heat

Westinghouse has introduced a new bathroom model 1,250-watt and 1,500-watt electric heater, both of the same size wall opening, both 115-volt. Has larger openings in its chrome grill to increase convection.

Easy to plan

The Man Who Plans, meaning **you,** is featured in the excellent and inexpensive sales promotional literature wrich EEI makes available in its Planned Lighting series. There is a new store lighting program just released with clever and telling mailing pieces. And so that you can present a neat and professional lighting plan to your present prospect and yet retain a carbon for yourself, there is a lighting layout form in a folder, with squared layout sheet, picture inserts, and a variety of gummed stickers of fixture types that you can use in your proposal.

Thumbs down

NECA passed a resolution at its Los Angeles convention making it a policy to oppose membership in AGC by its members as it makes such joint membership an obstacle to settling labor negotiation, etc.

Hot and portable

Wuelker Infra-Red and Lighting Co., San Francisco, has now published a new catalog illustrating and giving details of its infrared equipment, including its portable "Heatmobile," its ovens and panels, and in lighting, its portable work lights, etc. with Adjust-to-Angle features.

Guide

A monthly cost survey has been started by the Pacific Electrical Contractors Assn. of Portland. Secretary Roscoe Watts mails a questionnaire to each member monthly, asking for percentages of cost of materials, labor, and overhead to total sales. Tabulation is made of the unsigned cards and results announced to the members as guidance in their operations.

Tools to sell

To help you sell people on either modernizing their home wiring to bring it up to AW standards or to sell certification on new jobs the National Adequate Wiring Bureau has some fine tips in the last issue of its AW Reporter, the tools to use, how to get prospects, benefits to stress. Offers proposal forms, layout sheets.

Another hanger

Kindorf Co., designers and makers of a versatile line of single and multiple hangers for supporting conduit and pipe, has now developed a new support for fluorescent lighting fixtures from ceilings. It is a local Western concern, with factory in San Francisco.

Code deciding

Uniformity of electrical codes, at least in the East Bay cities of Alameda, Oakland, San Leandro, Hayward, Berkeley, Piedmont, Emeryville, Albany, Richmond, Calif., is being worked for by the electrical inspectors of those cities and the Northern California Chapter, NECA. The project has reached a stage of submitting to all interested a draft of the proposed deviations from the National Electrical Code compromised upon so far.

Spread

Allen and Olsen of Venice, Calif., showed four new designs of luminaires for slimline lamps at the San Francisco Electrical Exposition, among them an extended channel to mount lamps on 4- to 24-in. centers.

Place for it

A place on which to keep a record of the wire lengths cut from each cable is now provided on cable reels by General Electric Corp.

ELECTRICAL WEST Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

November 1950

More small than color seems to have exuded FCC's non-electric decision on color TV. Seldom has anything raised such a ruckus over so little. As it settled down deadlocked again, this time in suits, FCC asked RCA, which sought an injunction, to play marbles with CBS like a good boy, lending CBS its marbles of research so that all would benefit. Having been scooped on LP records by Columbia, RCA couldn't be blamed for counting ten. But as far as a dealer is concerned, all you have to overcome is the public's confusion, their premature excitement over color which makes for an "I'll wait" buying delay, and the higher credit terms and excise tax. Despite all this you ought to be able to sell all the sets the makers can scrape up components to make after the defense priorities take hold.

It boils down to this

When J. Clark Chamberlain of San Diego Bureau of Home Appliances scouted the manufacturers while he attended the IAEL meeting in Boston, Oct. 11-14, (that was before the second round of critical materials restrictions, however), these were his observations:

Our scout

"Electric housewares are in plentiful supply. It will take aggressive selling to move by Christmas all that has been and is being produced for this season. . . Refrigerators now much more freely available in the East and Midwest than on the Coast, will be easier during the next several months. Laundry equipment could free up some but little is expected. TV producers still are confident new records in production will be broken in spite of terrific component supply problems. We clearly feel that supply of most appliances will be such as to justify strong selling. . . "

Reports thus

So—San Diego Bureau is readying its big annual show, Nov. 24-29, at Balboa Park, has an electric bed covering campaign starting Nov. 6, and a Christmas appliance campaign right after the show.

No letup

It is too early for an educated guess as to next year or even after election. The Korean sample may even turn into a full-scale job and that would mean still more controls, restricted production, etc. At present writing price control seemed deferred til spring. Credit controls had not stopped much buying yet.

Controls?

Art Scaife of G-E told the Rocky Mountain Electrical League that production this year would equal 1949 but higher prices, shorter terms,

It adds up thus

curtailed home building might make it hard to sell it all. Higher down payments for homes leave nothing for appliances. Materials bought in grey markets at higher prices add $17 on a refrigerator, labor adds $20 in wage increases. Manufacturers may channel the bulk of product to defense production areas.

Ersats again

Distributors were told by Stanley M. Ford, vp, Chicago Electric, makers of Handihot line, at NARD convention, Coronado, Oct. 25-27, that though production may be cut back to 75% of 1950's rate in 1951 there may be less demand. Without chrome and plastics, substitutes may make appliances less attractive. He praised a forthcoming book by NEMA on "Selling Housewares."

Service manual

Timely if a war economy returns emphasis on service and repair is a new McGraw-Hill book, Electrical Appliance Servicing, by Wm. H. Crouse, which covers the electrical and mechanical principles and practical servicing techniques for all makes, illustrated with drawings, photos, exploded views, etc. Even has a section on special tools. Well worth its $7.50.

Mart news

Western Mart--"Know-how Wins" will be the theme of the Western Winter Market, Feb. 5-9, at Western Merchandise Mart, San Francisco. . . Krueger B. Jacobsen, formerly with LP Gas Assn., succeeds LeRoy Smith as secretary-manager of California Retail Hardware Assn., with offices in the Mart. . . Wm. P. Horn Co., space 570, now represents Stern-Brown Inc., Long Island, makers of Superstar table appliances.

L. A. Big Top

Los Angeles Electrical League's big All-Electrical Exposition at Pan Pacific Auditorium, Oct. 20-29, drew from 6 to 10 thousand per day at $1.50 admission but gave them money's worth in an hour-long Edgar Bergen, Charlie McCarthy, Ray Noble show. Outstanding exhibit was Dept. of Water & Power's all-electric kitchen and adequate wiring display, in which they said, "Picture yourself in an electric kitchen" and snapped one with a Polaroid camera and actually showed them what it looked like. Sewing machines drew big attention, probably because they were demonstrated. (Story next issue).

Field trip

Milt J. Sands, sales manager, Camfield Mfg. Co., visited Seattle, Portland, Spokane, Los Angeles and San Francisco conferring with distributors of its toasters and new automatic coffeemaker, and said prices would stay stable for awhile, supply be on allocation. Les Taufenbach Co., Camfield reps. in northern California, also handle several other noncompeting housewares--Durabilt irons, Handy Hannah hair dryers, Doray defroster clocks, Wastemaster disposals and some non-electric lines.

Will distribute

Household Products Co. of 2783 E. 12 St., Oakland, will distribute in northern California the Airflow 110-volt electric, plug-in type clothes dryer, made by National Engineering & Mfg. Co. of Kansas City, according to O. B. Wilt, factory rep. for 11 Western States.

Mountain conference

Intermountain Electrical Assn. staged its biggest sales conference in Salt Lake City, Oct. 20-21, (full story next issue), at which V. E. "Sam" Vining of Westinghouse was star attraction. E. E. Brasier, IEA manager, declared it a very valuable and informative conference with a program of top local and outside speakers, advance advice on the market and situation, real selling ideas for all to use and profit by.

Also next issue will be a report on the first board meeting in the West of the new National Appliance Service Assn., of which Keith L. Chamblin, California Electric Service Co., is president. It was held in Los Angeles, Oct. 15-17. — Also service

National Appliance and Radio Dealers Assn. has sent a letter to President Truman asking him to pull up the leash on some of the agencies that have been driving the appliance industry either into the red or the booby hatch—the double-take credit restrictions, and the TV color confusion. — Protest

Central Arizona Lt. & Power Co.'s "Back in Action" program has gone 113% over the quota in estimated annual revenue for the 12 months since it started and is being extended three months to coincide with the fiscal year. In the face of conditions next year's plans call for fewer but bigger promotions. A new appliance association, similar to San Diego's Bureau, has been born and promises to be a lusty pal in the overall sales program. — Continue in action

Outbid after having been awarded the acceptance, H. Leslie Hoffman and Hoffman Radio Corp. lost out in its attempt to buy from the estate of Don Lee the radio network and five radio and television stations. Hoffman had bid $11,200,000 but was raised the required 10% by a bank representing the General Tire Employees Retirement Plan, CBS and the Yankee Network. Since the Don Lee network owned stock in Mutual and CBS owns part of KTTV with Los Angeles Times, this will have to be unscrambled by FCC. — Outbid

Westinghouse's John McKibbin, vp and gm of consumer products, Pittsburgh, out West last month, shed this light on the appliance outlook: "We can't predict what's ahead, but our safest bet is to anticipate a selling market. The day of the salesman has returned. Most dealers will stay in business but they'll have to emphasize service, demonstration, consider the American home a market instead of a single sale. With increased prices dollar volume should remain the same in '51, though unit production will drop." Color TV, McKibbin declared, will be a problem in this present era of component shortages. — Looking ahead

Thor, feeling the pinch of shortages, has closed down all its West Coast offices—Seattle, Portland, Los Angeles and San Francisco. New distributors appointed for the areas are Seattle Hardware; Robert L. Rice Co., Portland; Kierulff & Co., Los Angeles; W. J. Lancaster Co., San Francisco. Barney Clawson, Thor's former San Francisco manager, has joined Lancaster Co., in charge of the Thor division. Harley A. Payne, former acting branch manager in Seattle, is now district manager, heading distributor interests for Thor in the Northwest. — Offices to distributers

Sacramento Electric League's new name is Sacramento Valley Electric League, changed to broaden the scope of activities. TV talk at a recent meeting went over big. William G. Barnes, Batten, Barton, Durstine & Osborn, was featured, plus a TV demonstration by league president Ed Berick. — New name

For the third time Hoover Co. won the bronze "Oscar of Industry" for the best annual report of the household appliance industry, rated by Financial World Survey of Annual Reports. Coxy Corp. was runner-up for top honors. — Oscars

TV sales in San Francisco and Los Angeles jumped to a new monthly high. In September San Francisco dealers sold 5,917 sets, 34% above August. Brings total sales to 92,000. . . Los Angeles reports 54,498 sets sold in September, boosting the total to 747,867. Current L. A. total shows a 300% gain over TV sales during the first nine months of last year. . . Salt Lake estimates there are 17,998 sets operating, 10,651 sold during first eight months of 1950; one to each 4.7 families.

TV still climbing

"Stop crying for us," Admiral says about its agreement for telecasting the L. A. Ram football games. Ray Cox, gm of Herbert Horn, Admiral's southern California distributor, came out with a few remarks to clear up all the stories about the beating Admiral's taken. Truth is, says Cox, we've got a good business proposition; our gate guarantee stops at $151,000; we get to televise 15 games, 9 live, 6 on film; we're getting our money's worth in advertising and making an important contribution in the development of TV.

Stop the tears

For farm electrification sales programs Edison Electric Institute is putting out a Speaker's Slide Kit. Consists of 88 slides on the use of electricity on the farm, all action shots illustrating equipment in constant use. Four 30-minute scripts are included in the kit. Available from the commercial department, EEI, 420 Lexington Ave., New York 17. Price is $25 f.o.b.

Farm kit

Hotpoint's latest offer to schools and education institutions is complete kitchens and home laundries at half the retail price, with periodic replacements at no cost, so student will be able to use current models. A big step in educating a new generation to the advantages of electric living.

Electrical education

Cory has bought up two companies, Micro Steel Products, maker of stainless steel coffee making equipment, and Flavor-Seal Cookware.

Control

Famous designer Raymond Loewy has designed Nesco's new electric roaster, using a white, grey and gold motif to harmonize with any kitchen decoration scheme. Roaster has a push-button cover release, temperature control dial, handles that don't get hot. Nesco says the new model has been "womaneered" so that a homemaker can prepare an oven-type meal with only a few minutes in the kitchen.

Womaneered roaster

Waring Products has added sales of the Durabilt line of irons to its own Waring Blendor and steam iron lines. Will market and distribute both through its national sales organization.

Adds to line

Utah Power & Light Co. is running a contest to get a label for its 1951 Market Forecast and Sales Plan. Dealers, wholesalers, plumbers, utility employees are eligible. First prize is $50.

Give it a name

Illuminated Christmas decorations are illustrated in Royal Electric's new full-color catalog for the holiday season. 1950 Royalites make strong use of plastics, new wall plaques, candle sets, indoor and outdoor tree sets, etc. Catalog is available from Royal wholesalers.

Holiday decorations

Fricidaire is outlining its future commercial refrigeration and air conditioning sales programs at regional meetings throughout the country. One meeting is scheduled for San Francisco with W. I. Buchanan, regional manager assisting a group of factory executives.

Making plans

In Salt Lake City

appliance sales are

On the Squares

"A natural," the tie-in of the square dance craze, television, and an appliance program is making business and plenty of activity for eight Crosley dealers in Salt Lake City. The unique tie-in actually makes their stores a branch of KSL-TV studio for an overflow crowd each Friday night when the Crosley Family Square Dance program goes over the air.

Conceived by Rolph Stoddard, Crosley promotion manager from San Francisco, to sell the entire "family" of the company's products, it hit the jackpot in square-dance crazy Salt Lake City. Its Mayor Earl Glade had declared, "Our aim is to make Salt Lake City the square dance capital of the nation." Its Hotel Utah features a square dance night each week. There are more than 100 square dance clubs in the city. Recently more than 14,000 people attended a square dance festival in downtown Salt Lake City.

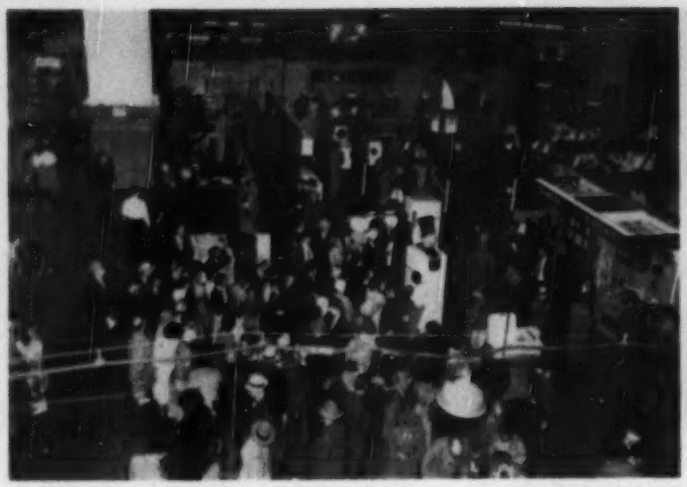
By combining one of the most popular Western bands, the top caller, Roy Koerber, Frank Urey, a favorite as MC, getting a pair of the best squares from each of the clubs to participate in each broadcast, and the home economist of the TV station, dressed in costume, to demonstrate the appliances, by having each dealer hold open house that evening and in turn bring his customers and friends to the studio to be introduced and featured, and by sharing the cost of all this between Crosley, Western Supply Co., its distributor and the dealers, it has made the biggest packaged promotion deal ever offered in those parts. The program started Sept. 22 and runs 13 weeks with an option for another 13. It is an hour show, from 8 to 9 p.m. each Friday evening.

Just as in square dancing itself, everyone is getting in on the act in the promotion of it too. The studio is featuring it in its advertising and its own publicity as a major attraction. Hotel Utah featured it on one of its square dance nights. Each of the dealers is displaying posters and is pushing contest blanks that offer three batches of prizes for a short statement as to why they like the show. Awarding of the prizes, Nov. 3, will also provide a big event. Dealers are writing letters to their customers and prospects inviting them to their stores to see the show on open house nights. On their special night they send invitations to the studio broadcast and a chance to be seen there by their friends over TV.

Immediately after the show the home economist from the studio appears in costume at one of the dealer stores, as if she had stepped out of the picture, to assist with serving of refreshments by the dealer to the assembled guests. Their windows are decorated to tie in with the event, and also to compete in a national window contest for a big prize.

Cooperating in this unique promotion are full line Crosley dealers: Schraeder Plumbing Co., Anderson Jewelry Co., Bradley-Badger, Breinholt Co., Dodge Bros., Fireside Furniture Co., George's Furniture Co., Hamal Furniture Co. and Western Supply Co., distributor. Russ Francis, sales manager of Western, is field-staffing the program while Stoddard of Crosley is now setting up a similar program in Seattle and has been asked to do so in Texas.

Typical of many excellent displays at Victoria's first postwar home appliance show staged by Victoria Kinsmen Club, dealer service section of B. C. Electric, and manufacturers for four days. Appliance sales climbed after this industry sales promotion



Crowds went for animated gimmicks like G-E walking refrigerator. Radiant Miss Wonderland opened the show with an atomic activated key

San Francisco Responds to Electrical Show

And its sponsor, Northern California Electrical Bureau, analyzes response to get tips for next year's show

For strictly an experimental show San Francisco's first postwar Electrical Wonderland Exposition not only made an important name for itself, but had all exhibitors clamoring for an even bigger exposition next year. It was easy enough to find praise for the highly successful show—an impressive attendance of 114,784 for the nine days, with 95,000 paid admissions, many people coming back three and four times to take it all in, enthusiastic remarks from both the exhibitors and people attending.

To lay plans for next year's show its conscientious sponsor, Northern California Electrical Bureau, decided to investigate public and exhibitor reaction, find out what exhibits had the greatest appeal, what suggestions could be gathered from this event that could be incorporated next year. NCEB gathered opinions from all segments, watched the crowds carefully to determine their interests.

As interrogator the bureau got the inside story, also several important ideas for future planning.

For instance, while there was enough scientific entertainment to satisfy the crowds, the bureau discovered that people wanted more exhibits of technical electrical devices. Next year's plans will be revised to satisfy their desires, says LeRoy Bennett, bureau manager. The show will be more representative of everything electrical, with less emphasis on household goods.

Live models were great on drawing crowds. This was apparent at one booth where a young woman demon-

Action from a conveyer line brought interest to even semi-industrial exhibits like this

Wiring materials people joined to sell adequate wiring. The Thomas Edison exhibit was one of the features people liked the most

strated a reducer. Incidentally, an exhibitor of vacuum cleaner devices, with a booth opposite the reducer, also enjoyed the benefit of these capacity crowds.

American Flyer, an electrical train booth, proved that manufacturers of trains missed a golden opportunity. The American Flyer exhibitor attracted the largest crowds at every performance, sold every train he had in stock, and ended up by selling his table display and all the equipment on it.

It was easy to discover what people liked best. Scientific and educational exhibits, like the Wonderland Theater and premier showing of the Ward Harris Edison Exhibit, sponsored jointly by the San Francisco Electrical Contractors Assn., and Local 6, IBEW, ranked high. These exhibits couldn't accommodate the people waiting to see them.

Performances had to be doubled on the General Motors scientific show and Westinghouse Theater of the Atom—and still all couldn't be taken care of.

One of several lighting displays that were bright spots in the show and drew crowds

Top attractions like Elektro, the mechanical man, and Sparko, his mechanical dog; Junior, the General Electric talking refrigerator; live radio and television shows from the auditorium were enthusiastically received.

Both the Army and Navy exhibits played to capacity crowds. People took advantage of their unusual opportunity to see modern navigational devices, films on the atom bombing of Nagasaki and Hiroshima. Response was so keen on this type of exhibit that more of a similar nature will be planned for next year.

Interest was strong on appliances and television. One distributor reported that the value of the show to him was in presenting a full line of appliances to the public. His dealers were so short on supply they could no longer show a complete line.

Informative exhibits featuring the latest in radar, electronics, lighting, wiring, radio and air conditioning were well received.

In determining what media attracted the crowds, one survey showed that newspaper ads and publicity had the largest pulling power, with word of mouth second, Pacific Gas and Electric Co. stickers third and radio announcements fourth.

From all sources, one fact was clear. NCEB's decision to go ahead with the exposition despite the Korean crisis was a wise move. Regardless of the times, San Franciscans proved that they are vitally interested in everything electrical. And with its inside view of public reaction, NCEB has a sound basis for planning an even bigger show in the fall of '51.

ELECTRICAL WEST

NECA Gets Down to Business

WITH a theme, "Progress through efficient management and training" and absence from the convention of any union representation, the National Electrical Contractors Association's big national convention in Los Angeles last month brought back into focus the fundamental that success in the contracting business depends on how it is run as a *business*, not merely whether it is a labor brokerage setup. For while no one discounted the importance of amicable labor relations nor the effect of labor problems on the ability to run a business profitably, the realization came back strongly that it is *management* that counts.

And management, it was seen, takes skill that seldom comes naturally, is much more surely acquired and brought about by training. It encompasses the whole field of financing and accounting, sales and engineering, accurate estimating and analysis of each job, then the efficient management of the job, wise purchasing and over-all good administration of the business. It is also significant that NECA is taking back to its headquarters to direct such a training program the creative young man who has done so much of this already in his Western Region, E. R. Cornish.

Faced again with unpredictable difficulties of labor, supply and regulations, contracting will need the keenest skill to survive.

Only Production Can Show Inflation

AMERICA'S economic and national security is going to depend upon the ability of the nation's industrial machine to speed production. This was brought out forcefully by Southern California Edison's President W. C. Mullendore speaking to the NECA convention in Los Angeles last month. He said:

"Wherever the magnitude of the problems which face the American people today is discussed, the source of strength which we hear most often referred to as offering the greatest hope of a solution of our economic problems, is increased productivity. And as we analyze this increased productivity upon which so much reliance is placed, we find that whether in the factory, in trade and commerce, in the office, store or home, or on the farm, it is electrical energy which has made the greatest contribution—greater even than the internal combustion engine."

The fact of our industry's importance in this emergency presents both a challenge and an opportunity. Before we disband our sales organizations and give up our selling because of equipment and material shortages, we might well examine our responsibilities and opportunities. The contractors and distributors both can offer their knowledge and skills to industry and commerce to help conserve manpower and to boost productive efficiency. The manufacturer can do the same with his equipment. The power company sales forces can work to see that every industrial customer makes the most efficient use of electric power.

If by so doing our industry can help to boost production so that the 15 to 20% extra defense mobilization can be absorbed, it will have performed several great services. It will have slowed down the inflationary spiral that conceivably could wreck the nation. And it may have obviated some of the restrictive and strangling government controls that threaten to be equally dangerous to our economy.

Get a Priority on TV

"BUY your television time now wherever possible." One of the electrical industry's foremost promotional men currently is giving this advice to his friends in the power companies. He forecasts that within two years there will not be sufficient television time available for all of the potential users. Hence priorities established now may become an irreplaceable asset.

The validity of this advice can be attested by anyone who has studied the promotional and educational potentialities of TV. The advertising impact of TV amazes even the greatest of skeptics. Phenomenal results are reported by those who are using the medium intelligently for direct selling. But even more important to the utilities is the institutional story-telling possibilities of this new mass media for reaching the public. The recent experience of one Western power company proves this. Part of its community relations program is

EDITORIAL VIEWS

a "slap board" story on Americanism. The local TV station knew about the program and asked that it be telecast as a sustaining feature. At the initial showing the announcer unwittingly gave the air audience a perfect opportunity to react. When the program ended, he said, "This presentation does not necessarily represent the policies and beliefs of this station but solely expresses the opinion of the speaker and his organization." Scores of phone calls and hundreds of letters poured in wanting to know if the station did not believe in the principles of Americanism, then just what did it believe. Other stations have telecast institutional motion pictures made by utilities with fine audience reception.

Back in the early days of radio the suggestion was frequently made that power companies invest in broadcast programs an amount equal to the revenue received from the receiving sets on their lines. Today, the same thing holds true for television. This would be a wise investment from many angles. It would pay off in greater public acceptance of every electrical application and in greater public understanding of and appreciation for utility service.

Prevent a Brainpower Shortage

INDUSTRY and the engineering profession might both well afford to act now to bring order out of the confused technical manpower situation. The present shortage of trained technical people brought about by defense mobilization certainly threatens to get worse before it improves. The demands of the military coupled with the active and competitive recruiting of industry far exceed the supply of young engineers.

Draft deferment for young engineers in industry and for engineering students is badly confused. The college and universities are seeking a reasonable program for deferment of professional students. However, it is both unfair and unwise to place the whole burden of obtaining deferment on the educational institutions. Industry and the engineering profession could and should share some of the responsibility.

The medical profession has worked closely with the draft and military authorities to keep medical students in school and then to see that they practice their profession when they are called to the colors. None of the engineering societies has attempted to clarify the position of the engineer. It is safe to wager that there were far more engineers in non-engineering positions in the last war than the reverse. The same situation holds for the present emergency. Of some sixty recent engineering graduates from one Western university who entered military service only two had any assurance of practicing their profession.

The confusion and social pressure occasioned by lack of policy is not good for the young engineers in industry or for those studying engineering. As a result industry is handicapped by the drying up of the reservoir of young trained technicians. The entire problem is one which industry, the engineering profession and the military should try to resolve in the cool of the evening rather than in the heat of the day.

"THE release of individual energy under adequate incentives is the most creative force in the world. Allowed to go forward this drive will carry us to undreamed of heights. Let us therefore dedicate ourselves to the task of securing for ourselves, for others, and for posterity these rights of free men in this century: [1] The right to personal initiative; to choose freely; to lead but not to dictate; to follow but not be driven . . . [2] The right to opportunity; to have a chance to forge ahead by his own efforts; to succeed or fail; and if he fails, to try again . . . [3] The right to personal dignity; to be protected from those impositions of others which they would not impose on themselves . . . [4] The right to participate in affairs of common concern; to hear and be heard; to stand alone or to be one among equals . . . [5] The right to provide for the future; to save or to spend; to advance or hold still; to be the judge of his own welfare.—From the Boston Declaration issued by 51 Industrialists attending the Boston Jubilee Conference.

Electrical Industry Able to Do its Part in Defense Mobilization, RMEL Speakers Attest

M. C. Hoffelman W. D. Johnston

Any doubts as to the ability of the electrical industry to assume what additional burdens that may be occasioned by defense mobilization were dispelled at the 47th annual meeting of the Rocky Mountain Electrical League at Colorado Springs Oct. 8-11. Over 300 registrants, largest group ever to attend such a gathering, heard speaker after speaker attest to the all-out readiness of the electrical industry.

League President W. D. Johnston, vice-president, Mountain States Power Co., pointed up the dynamic character of the industry when he declared that the day never has been and never will come when the business can sit back and say that all its problems have been solved. As example of this he cited the new demands for additional capacity today just when it appeared that reserves were becoming adequate and also the financing burdens occasioned by higher costs. Utilities, he said, are faced with the job of building revenues to new heights or with raising rates to offset higher costs. He urged the former as the most desirable course.

The American people, American industry and the armed services are entitled to the same high standards from their political and diplomatic organizations as industry displayed in producing the goods that won World War II, Robin S. Kersh, manager, central station department, Westinghouse Electric Corp., told the gathering. Electric utilities of the nation have ordered 10,000,000 kw. of new generating capacity since Jan. 1, 1950, despite the fact that they had 14,200,000 kw. on order at that time. The three largest electrical manufacturers have spent $750,000,000 on new facilities since the end of the last war and their productive ability is three times greater than it was in 1940, he declared. Other branches of the industry are similarly equipped to meet present-day emergencies. Electrical distributors are doing $4½ billion annually now as compared to $1 billion in 1940. The contractors are equally well geared to higher construction levels.

"Our industry must decide now if it wants to fight or to fumble," E. P. Lovejoy, director of public information, Detroit Edison Co., told the meeting in a moving plea for full participation in the national PIP program. Purpose of this activity is to raise the status of the industry nationally to the same high plane which individual companies hold locally. The audience to be persuaded, he said, includes those among the industry's customers and employees who are unconvinced or who do not know.

In the same vein Robert S. Peare, vice-president, General Electric Co., declared that the rank and file of the industry's employees do not represent a problem but an opportunity. He proved this by detailing results of an opinion poll which indicated a widespread swing to the right on the part of people in general. Stockholders in American business and industry are the last great unorganized group, he said, and they must organize sometime to make their influence felt. Utilities that fail to take advantage of television as a great potential medium for reaching both the public and their customers with sales and institutional messages are missing a bet, according to Peare. He declared that utilities might well spend an amount equal to present television revenues for programs via this medium.

Political claims to the contrary, capacity reserves of the power companies are adequate for the present emergency, according to L. V. Sutton, president of EEI. The postwar plant expansion program will assure November reserves of 8,000,000-9,000,000 kw. or 14% he said. The industry has an output of capability of 71,000,000 kw.—57,000,000 in private plants and 14,000,000 in government stations—he declared. There is an additional 13,300,000 kw. in industrial plants. By 1953 the nation's total output capability should exceed 107,000,000 kw., he indicated. Based upon the experiences of the last war, he pointed out, defense demand diverts production from peacetime facilities and places little new strain on power capabilities.

J. Don Alexander, president of Alexander Film Co. one of the largest producers of motion picture and television trailers in the U.S., showed some outstanding examples of how these two media can tell any phase of the industry's story, either sales or institutional.

In the great international fight for people's minds all industry might well speak of its own employees first, according to K. M. Haagensen, public relations director, Allis-Chalmers Mfg. Co. He contended that it is the responsibility of management to talk freely to their people on the economic facts of life, using factual and truthful arguments.

How the NECA is helping the contractor to keep pace psychologically with the balance of the industry was told by E. R. Cornish, Pacific Coast director of NECA. Programs on estimating, accounting and job management have been prepared to assist the contractor in overcoming his inability to price his work properly and to stimulate his salesmanship. Cornish pointed to the recent stand of the electrical contractors against federal public power. One of the highlights of the meeting was the demonstration of new lighting equipment and lighting sales opportunities staged by Alston Rogers, Lamp department, General Electric Co. His exhibition was condensed from his performance before the Pasadena convention of the IES (EWEST, September, p. 70).

None of the industry's cooperative promotional programs will be dropped short of an all-out war emergency, according to J. T. Coatsworth, com-

K. M. Haugenson J. W. Bullock

R. S. Peare Arthur Prager

mercial manager, EEI. Despite production curtailments, strong sales and merchandising programs may be necessary to dispose of the next year's appliance production, he declared. EEI and NEMA have a national electric range promotion in preparation for early 1951 and a commercial electric cooking campaign in the works for later next year, he announced.

Effects of material shortages on appliance production were detailed by A. L. Scaife, merchandise manager of traffic appliances, General Electric Co. He expects 1951 production to be cut back to 25% below this year in terms of units, although dollar volume next year may equal present figures because of price increases. Copper, steel, nickel, chrome and titanium are the critical items in appliance production. He reported that his own company has a backlog of 1,650,000 electric irons against a total production of 950,000 of those appliances in 1941. The distributor and dealers with their sales forces represent a great unenlisted army for telling the free enterprise story in his opinion. He declared that this story should be on the agenda of every sales meeting.

The story of how private enterprise has done an outstanding job of valley development as told by T. E. Roach, president, Idaho Power Co., is printed on p. 61 of this issue.

Ability of the U.S. to lead the world in achieving a peaceful world order will depend upon the military, economic and moral strength of the nation, according to Henry Sargent, president, Central Arizona Light and Power Co. "For the United States to expand its strength sufficiently to make Russia back down or to defeat Russia in case of total war is going to require sacrifices on the part of the American people," he said. "A number of our national leaders have expressed fear that the American people would not be willing to make such sacrifices without a war going on to serve as an inspiration. The American people in the past have and are now willing to make any sacrifice for any period of time necessary if our leaders will properly inform them and trust them. A long-range program placed before the American people with proper leadership will secure results far outweighing those secured by spasmodic emergencies. In furnishing this leadership the electric utility industry will bear its full share of the load."

The challenge that a growing community presents to the utility furnishing it service was graphically depicted by Arthur Prager, president, Public Service Co. of New Mexico. He used Albuquerque as an example and traced the business, population, industrial and economic growth of that community over a ten-year period and related these to the development of the electric utility and at the same time traced both favorable and unfavorable factors affecting community development.

"We are realizing throughout the South and West," Prager said, "that too long we have remained hewers of wood and drawers of water, too long our economy has been based primarily upon raw material production, too long we have shipped our raw mate-

L. V. Sutton Henry Sargent

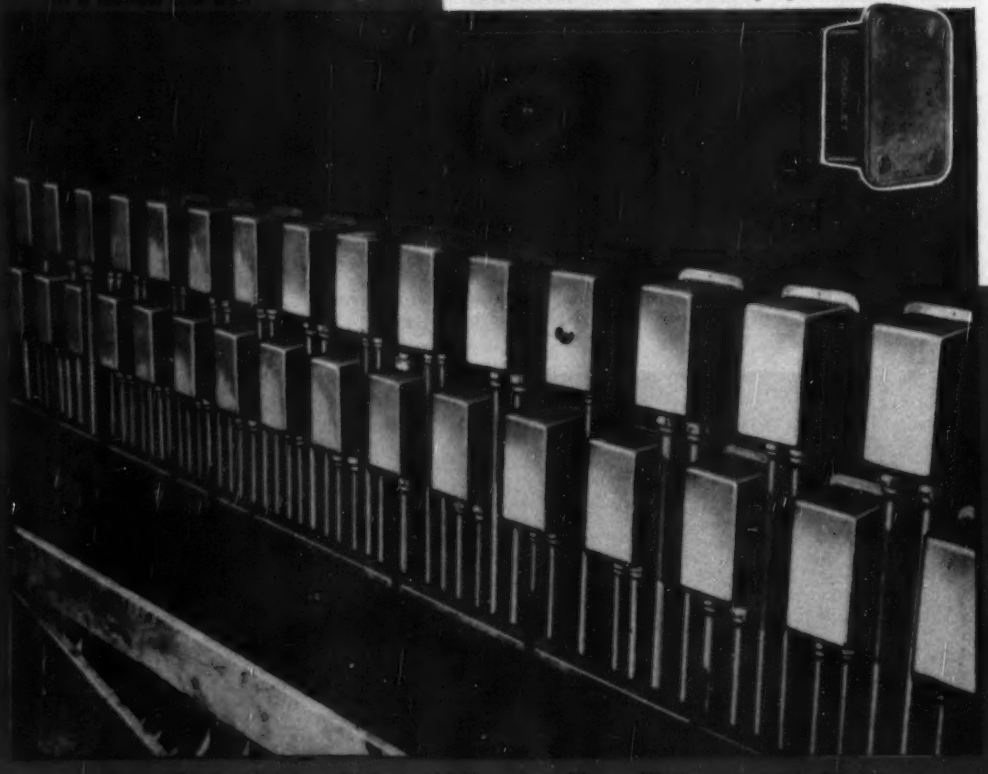
Ralph Hubbard R. S. Kerah

the CONDULET* and rigid conduit method gives you maximum

PROTECTION and SAFETY in concealed work

When you plan a job of concealed electrical wiring, every factor that has a bearing on the kind of service it will give throughout the life of the installation should be carefully considered.

**CONDULETS are made only by CROUSE-HINDS*



1 ECONOMY ... Add up the material and the installation costs and you will find that Condulets and rigid conduit compare favorably with other wiring methods. Then consider the other advantages and you will find that Condulet and rigid conduit is the really economical method that pays extra dividends over the years.

2 GROUND CONTINUITY is of vital importance in concealed work because any joint that isn't tight in the beginning makes a high resistance point and after the concrete has been poured there is never any way to locate and correct the faulty condition. CONDULETS, with their taper threaded hubs, and rigid conduit with its tapered threads make a secure joint that provides a reliable and permanent low resistance path to ground. This SAFETY feature affords maximum PROTECTION against personal injury and fire.

3 CORROSION RESISTING ... Cast Feraloy Condulets offer the best PROTECTION wherever moisture, dust, or corrosive atmospheres are present. This quality is very important in concealed work because corrosive tendencies are greatest where there is a change of medium, as at the point between the floor or wall and the air.

4 FLEXIBILITY ... In concealed work Condulets with blank covers can be placed at strategic locations to provide future outlets to meet changing conditions.

5 SECURE ATTACHMENT OF DEVICES ... The mounting holes in CONDULETS are drilled and tapped in the cast metal body — no weak mounting ears to twist off. All devices are FIRMLY attached.

6 QUALITY ... For more than forty-five years CONDULETS, made only by CROUSE-HINDS, have been the standard of quality, built from the finest materials, with painstaking care, by skilled craftsmen.

7 VARIETY ... There are thousands of types and sizes of CONDULETS, plugs and receptacles, and lighting fixtures including a complete explosion-proof and dust-tight line for use in hazardous locations.

On your next job of concealed work, plan to get all of the benefits of sturdy Cast Feraloy CONDULETS and rigid conduit. Send for additional information on modern CONDULET installation.

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Milwaukee Minneapolis — New York — Philadelphia — Pittsburgh — Portland, Ore. — Salt Lake City San Francisco — Seattle — St. Louis — Washington. Resident Representatives: Albany Atlanta — Baltimore — Charlotte — New Orleans — Richmond, Va.
CROUSE-HINDS COMPANY OF CANADA, LTD., TORONTO, ONT.

Type EHS Explosion-Proof Switch Conduiet in a hollow tile wall

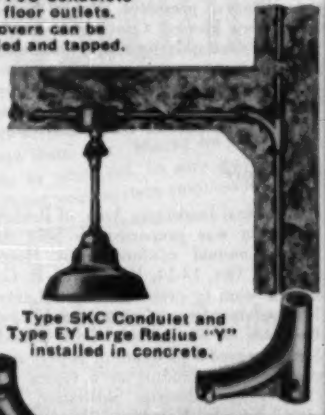
GUA Series Explosion-Proof Condulets with lugs for nailing to concrete forms.

Type AD Watertight Condulets for flush mounting in floors or walls.

Type FJC Condulets for floor outlets. Covers can be drilled and tapped.

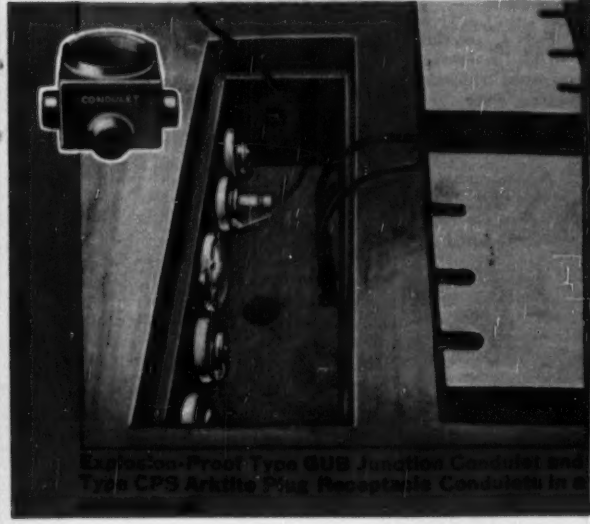
GRF Series Condulets with slotted nailing lugs.

SK Series Condulets with nailing lugs. For walls, floors or sidewalks. Have flush cover screws.



Type SKC Condulet and Type EY Large Radius "Y" installed in concrete.

A Nationwide Distribution Through Electrical Wholesalers



Explosion-Proof Type GUB Junction Condulet and Type CPS Arktite Plug Receptacle Condulets in a

Type AEQ Arktite Plug Receptacle

risis out and our finished goods in, too long our human resources have been confined largely to the already industrialized areas. Local leaders everywhere today are interested in bringing about a better balance in our local economy and we must be ready to help."

A luncheon and a dinner session were addressed by J. L. Zwingle, president Park College, Parkville, Mo., and Tom Collins, Kansas City publicist, respectively.

M. C. Hefflelman, manager of the Public Service Co. of New Mexico at Santa Fe, was elected president to succeed W. D. Johnston. New vice-presidents are J. B. French, president, Black Hills Power Co.; H. H. Lenhart, general manager, Cheyenne Light, Fuel & Power Co.; J. W. Cryder, president, Colorado Central Power Co., and Arthur Prager, president, Public Service of New Mexico. Convention details were directed ably by Ralph Hubbard, RMEL secretary-manager. The program for the meeting was arranged by Kenneth Haines, assistant to the president, Public Service Co. of Colorado.

Inspectors

Electrical Inspectors Assn. of British Columbia was preparing to hold its second annual conference at Hotel Georgia, Oct. 13-14, Vancouver, B. C., as this went to press. President Lance Robson, inspector of electrical energy, Province of B. C., and fellow officers had prepared a program of papers and discussions, including such topics as: "Safety in Industrial Substation Design," by Fred Kempton; "Modernization in the Forest Products Industry," by W. L. Stevens; "Public Relations," by R. Pullen; "Canadian Standards Association," by J. D. Barnes of CSA, Toronto; "Distribution Panels," by J. Low; "Aluminum Cables and Conductors," by L. G. Bartlett; "Fire Protection in Public Buildings," by H. Jenns and "Progress of the B. C. Power Commission," by General W. W. Foster. J. H. Steel of B. C. Electric Co. Ltd. was speaker at a joint luncheon with Vancouver Electric Club. . . . At the last monthly meeting of the group, inspectors problem topics included non-use of anti-short bushing with armoured cable; connection of water heaters to two fused circuits instead of a separate circuit off the main feeder; leaving meter bases and current transformers uncovered; and requirement for polarity plugs on portable tools.

Utah Chapter, IAEI, began its 1950-51 series of meetings with R. K. Williams, its new chairman, presiding. He appointed an executive committee in addition to the officers elected at the annual meeting (R. K. Williams, chairman; W. T. South and J. A. Thomas, vice-chairmen; A. E. Fleming, secretary-treasurer) to serve for the year with him. They are: J. Hyde Stayner and C. W. Coleman, utility; L. B. Johnson, manufacturer, Harold Morr, fire rating bureau; L. John Christensen, member-at-large and Loran M. Christensen, new chief inspector, Salt Lake City. The latter presented a report on the Northwestern Section meeting at Seattle. He announced new rulings that a range receptacle would be required for all future range outlets; connecting solidly to the circuit will not be permitted. He also said a set of rules for installation of heating cable on roofs for de-icing would be issued soon. At the Oct. 10 meeting, it was voted to recommend to the city that a standard range receptacle be required. The 20-amp. circuit proposals of EEI and Adequate Wiring are to be made the subject of future meetings.

Montana Chapter, IAEI, will hold its next annual meeting in Great Falls, according to Walter Lindsay, secretary, sometime in March or April, the exact date depending on other Rocky Mountain region chapters' meeting dates.

Oregon Chapter met last in Portland with James Vernon presiding, but decided to hold the next meeting in McMinnville in November, and in Eugene in January. Standard requirements for services and service drops and for temporary services throughout the state were asked of the power companies. Use of range receptacles for welders and motors loads was discussed but, unless horsepower rated, were found unsuitable. Grounding of all boxes was discussed at some length but voted down. Bell transformers, it was decided, should be located only where readily accessible, not covered.

Arizona Chapter had a meeting scheduled for Nov. 18 at Tombstone, and the agenda was a general discussion of inspector problems.

Sacramento Valley Chapter, IAEI, has scheduled a meeting at Sacramento for Dec. 2 . . . Next meeting of the Southern California Chapter is scheduled for Compton, Nov. 15. Election of officers for next year will take place then.

Highlights of the section annual meeting at San Jose were to be given the Central California Chapter, IAEI, at its next meeting, Nov. 16, by H. G. Ufer, Underwriters' Laboratories and Southwestern Section secretary, and Larry Trim, Burbank chief electrical inspector. At the previous meeting, held at Kingsburg in August, over which Vice-chairman A. W. Nelson presided, Clyde Smith made a report on fire losses in the county compared to Fresno city, indicating a need for county inspection. Objection was also raised to interchangeability of circuit breakers in a panel, as appliance dealers were reported to be changing them for those of higher rating and contractors getting the blame.

Puget Sound Chapter has its next meeting scheduled for Seattle, Dec. 2. At its last meeting, before the Northwestern Section annual meeting, John Hewitt, chairman of the legislative committee, felt that separate bills covering sales control, licensing of wiremen and a permit and fee system for the state should be offered instead of one bill. He also urged complete agreement in the industry on the bills before their submittal. In code discussion a letter from L. W. Carlisle of Eugene regarding lack of protection afforded No. 18 cord connected to 20 amp. circuits led to a motion to ask the elimination of all No. 18 cords except when built-in cord protection is provided. Likewise action was taken disapproving any more confusion by introduction of the Type-X fuse. Motion was passed to ask that the fine print note following Section 2452 be deleted.

IEA

Intermountain Electrical Assn.'s new president is James L. Schricker, division manager of appliance sales for General Electric Supply Corp., Salt Lake City. Schricker, who has been a member of the association since its organization, served previously as secretary of IEA. Other officers are J. C. Jacobs, Apex Electric Co., vice-president; Mark Austin, Sunbeam Heating & Electric Co., secretary-treasurer. On the board of directors for the various districts are: Cache Valley—R. Eugene Elwood, Cache Valley Electric Co.; Ogden—Dan Van Kampen, Van Kampen & Sons Co.; Salt Lake—John Elliott Clark, Clark Radio & Appliance Co.; Sevier—Ted Sorensen, Sorensen Electric Co.; Southeastern—O. B. McKinnon, Eastern Utah Electric Co.; Utah—George W. Hawkins, Hawkins Furniture & Hardware Co.

Leagues

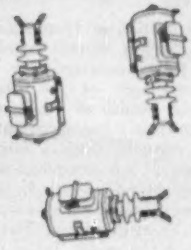
Sacramento Valley Electric League had as a recent speaker J. A. Barnes, radio and TV director of Batten, Barton, Durstine & Osborn, San Francisco.

Pot and Kettle Clubs

Spokane Pot and Kettle Club has elected the following new officers: Herb Becker, president; J. T. Berger, vice-president; R. E. Skindlove, secretary; R. L. Roller, treasurer; Frank Martin, recording secretary.

New Outdoor Current Transformer Type KO

Mounts in Any Position



Type KO current transformers solve your installation problems in more ways than one. Mount on frame, pole or platform, in any position to meet your system requirements.

Type KO Outdoor (compound-filled) current transformer. Available in standard current ratings up to and including 800 amperes and three voltage classes: 5, 8.7 and 15 KV.

ALLIS-CHALMERS
CURRENT TRANSFORMERS

Highly Accurate on Metering Burdens

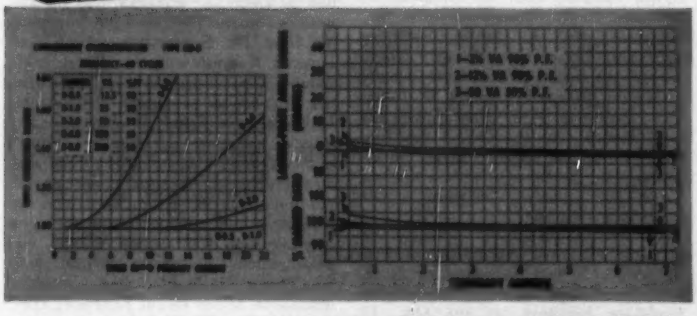
NEW VERSATILITY in mounting . . . high accuracy in metering and heavy duty relay application — that's the story on the new Type KO out-door current transformer. Linemen like it because they can install it quickly, easily in any position.

Primary leads are brought out conveniently to blade type terminals through a porcelain bushing designed with generous creep surface. Secondary leads terminate in a weather-proof terminal box. Box cover readily swings open after loosening the barrel type locking bolt — no parts to drop or lose. Secondary connection through conduit openings made to stud type terminals in this sealable compartment.

Type KO transformer housing is completely welded, pressure tested and hermetically sealed. Maximum insulation strength is achieved by compound filling under a "vacuum-pressure" process which entirely eliminates air. This results in low power factor and a maintenance-free installation.

For more information on Allis-Chalmers wide range of instrument transformers write for bulletin 61B7168 or see your nearby A-C sales representative. A-3143

ALLIS-CHALMERS, 939A SO. 70 ST. MILWAUKEE, WIS.



The excellent performance of Type KO current transformers is represented in the above curves. They meet or better ASA and NEMA standards.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

Contractors

Idaho State Electrical Contractors Assn. has set Nov. 17 and 18 for the dates of its annual, all-state convention. It will be held at the Owyhee Hotel, Boise. Ad R. Woolley, Mountain Electric Co., Pocatello, its president, and a group of committees in Boise are making arrangements. Major topic, as in the past two meetings, will again be the strengthening of the state electrical code law. A preliminary group of meetings was held in Boise, Twin Falls and Moscow in September and October.

Northwest Conference of NECA Chapters held a preconvention meeting in Seattle at the offices of the Puget Sound Chapter, Oct. 6. Presided over by E. B. de Feyter, president of both the Spokane Chapter and the conference, twelve representatives of the three chapters in Seattle, Spokane and Portland met to discuss proposed constitutional changes in the National Electrical Contractors Assn. convention agenda.

Regulations, priorities and the manpower situation were all topics under consideration at the Oct. 26 meeting of the San Francisco Electrical Contractors Assn. A report was given by Charles A. Langlais, chapter governor; W. T. Kennedy, president, and W. J. Varley, executive manager.

Howard F. Hume, Hume & Rumble Ltd., is the new president of the Associated Electrical Contractors of British Columbia. Harry J. Sayer has been elected vice-president, and Kenneth J. McRae named secretary. C. H. E. Williams Jr. is treasurer.

EMEA

Power system planning for the future growth of Los Angeles was the topic reviewed at a recent meeting of Electrical Maintenance Engineers Association of Southern California. The speaker, A. L. Williams of the Department of Water & Power, presented figures predicting future requirements of power based on population and land rise studies . . . A field trip to the Kaiser Steel Corp. at Fontana proved to be of such interest that another trip was made to accommodate all the reservations, 302 for the first trip, 190 for the second . . . EMEA designated a recent meeting as "Boss-Nite," gave members special invitations to send to their bosses. Television was the topic of the evening, discussed by Milton J. Shapp, president and chief engineer of Jerrold Electronics Corp., Philadelphia. Illustrating his talk with demonstrations, Shapp described the master antenna system for television sets whereby numerous sets may be operated from one antenna. Joseph M. Smith, California representative for Sola Electric Co., was guest speaker at the group's Oct. 18 meeting. He discussed use of constant-voltage transformers in industry, research and television; also new developments in transformers for slimline lamps.

A technicolor film, *Power by Which We Live*, was shown to members of EMEA of Northern California recently. The movie depicted the engineering and manufacturing effort in the building of steam turbine generators.

IES

Oregon Section of Illuminating Engineering Society recently heard a talk on light and photography by Claude Palmer, manager of the Photo-Art Commercial Studio of Portland . . . In the chairman's report for the 1949-50 fiscal year, the Oregon Section reported that it was presented a check for $40, as second prize in the national membership contest and an increase of one-third in membership. The award was made at the recent National Technical Conference of IES at Pasadena.

New developments in lighting were discussed by Dr. Edwin F. Lowry, head of engineering research for Sylvania, at a recent noon meeting of Utah Chapter, Illuminating Engineering Society . . . Charles R. Long, Pacific Coast district engineer of Westinghouse Lamp division, was programmed as guest speaker at the Oct. 19 meeting. He showed demonstration equipment on the new white colors of fluorescent lamps, hot vs. cold cathode demonstrations, and several others.

New officers of the Southern California Section, IES, are William A. McGuire, F. W. Wakefield Brass Co., chairman; Roy E. Dahlin, Southern California Edison Co., secretary. Members of the board of managers include J. Walter Howard, Charles R. Long, F. J. Rohring, W. L. Friend. Officers were installed at the Oct. 4 meeting. In addition the speaker at the meeting was Ed R. Benton, with a talk on FHA Title 1 lending programs in the lighting fixture field.

Speculations or Specifications was the title of a talk delivered by J. H. McCulloch, development engineer for Sunbeam Lighting, at the Oct. 12 meeting of the Northern California Section, IES. McCulloch's talk was similar to his article which appeared in ELECTRICAL WEST, September 1949.

H. T. Rankin, Public Service Co. of Colorado, heads the Rocky Mountain Section of IES for 1950-51, with G. B. Buck II, General Electric Lamp Division, as vice-chairman; F. Bischofberger, Public Service Co. of Colorado, secretary-treasurer. Board of managers includes Howard Ernst, James L. Vanneman, Glenn Gaer, Arthur F. Weers.

S. C. Smith has become chairman of the British Columbia Section of Illuminating Engineering Society. R. Merritt is secretary-treasurer, and R. M. Campbell, C. A. Morrison, R. Racine, R. G. Scott, E. W. Thompson, managers. Committee chairmen are E. E. Ackland, membership; K. H. Bancroft, attendance; R. Bemister, publicity; D. Gordon, study group, and W. J. Line, meeting and papers.

AMA

Officers of the newly organized Appliance Merchandisers Assn. of Phoenix are R. J. Morrissey, Mehagian's Home Furnishings Inc., president; E. A. Thomas, Arizona Wholesale Supply Co., vice president; J. T. O'Neil, Home Supply Co., secretary; Leon Black, Black & Ryan, treasurer. Board of director members are Marriel Hamilton, New State Electric Co.; Floyd Ikard, Ikard-McMindes; Ivan Rosebraugh, Vinson-Carter Electric; Robert G. Forsyth, Electrical Equipment Co. of Arizona; L. H. Shaff, Central Arizona Light & Power Co.; Ernest Fannin, Fannin's Gas & Equipment Co.

Electric Clubs

This year Electric Club of San Diego's school-club educational contest will be building an electric test instrument. Kick-off luncheon was staged recently and instrument kits distributed. Closing date for the contest is Dec. 11. Winners will be announced at the Electric Club luncheon on Dec. 19. Competing schools are Hoover, Kearney and San Diego high schools. The committee members working under club president, William H. McKinley, are Frank W. Sloan, chairman of the general committee; Howard Craghead, chairman of means and award; Roy Dickerson, chairman of publicity; E. B. Kipp, chairman of judging . . . Guest speaker at a recent meeting was William de Waard, superintendent of stores department, San Diego Gas & Electric Co., with a discussion of his recent European trip.

Walter D. Howell heads the East Bay Electric Club as its newly elected president, with Donald H. Relfe as vice-president; William C. Rowley as secretary-treasurer.

YOU GET POSITIVE CO-ORDINATION—WITH BREAKERS, WITH RECLOSERS IN SERIES, AND WITH FUSES

The rugged mechanical timer of the FR-1 operates in air. Its time-current characteristics remain exactly as published regardless of temperature, or viscosity changes of oil.

Holds Service Trips to Minimum

The FR-1 resets in a matter of seconds. You avoid unnecessary fuse blowing and recloser lockouts from rapidly recurring faults.

Picks Up the Load Easily

Inrush current can't lockout the FR-1. It has an exclusive "time-delay" function—holds closed until inrush currents have subsided, then automatically resets for normal operation. This also permits the use of fewer sectionalizing points—makes possible a saving in system investment.

No other recloser combines all the essential features of the FR-1. For a more complete story, write for GEA-1934. Address your nearest G-E Apparatus Sales Office or *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

THE MONTH IN BRIEF

El Paso Electric, USBR, Sign Contract

El Paso Electric Co. will deliver to the USBR up to 15 mw. of dump power under a contract to begin not later than September 1951 and to run through 1957. The bureau will use part of the energy to supplement generation at Elephant Butte, where water is available only for peaking, but will deliver most of it to Public Service Co. of New Mexico at Albuquerque under a separately negotiated contract. A 30-mw. addition to El Paso's Grande plant is scheduled for completion early next year and will bring plant capacity to 108 mw. Ample supplies of natural gas are available and the contract contains a fuel clause to protect the company against price changes. A 44-mile, 115-kv. line will be built to carry the power from the plant to Las Cruces, N.M. USBR will soon start construction of 80 miles of 115-kv. line into Albuquerque from Socorro, N. M., present terminus of its line north from Elephant Butte. Public Service of New Mexico will take delivery at Albuquerque at a rate that will result in a load factor not to exceed 51% for any month. The New Mexico contract also provides for delivery of dump power up to 10 mw. back to the bureau as requested between 11 p.m. and 7 a.m. and sets an annual minimum purchase of $350,000. Public Service of New Mexico has scheduled a 20-mw. unit at a new generating station in Albuquerque by October 1952.

Roseville Signs With PG and E

After five years of purchasing power from Pacific Gas and Electric Co. on a month-to-month basis pending expected deliveries from USBR, the city of Roseville, Calif., has signed a five-year contract with the power company. Effective Oct. 31, the contract sets rates some 11% lower than the month-by-month charge.

Adams County PUD Defeated

Proposal to form a PUD in Adams County in eastern Washington was defeated by the board of county commissioners. A petition seeking a PUD was opposed by Washington Water Power Co. and the Big Bend Electric Co., an REA group, which now serve the district, and by large land owners.

Water Users Approve Steam Plant

A $4,500,000, 30,000-kw. steam plant was approved Oct. 16 by shareholders of the Salt River Valley Water Users by a vote of 18,708 to 987. The plant will be built between Tempe and Chandler, southeast of Phoenix, Ariz., and is the association's answer to mounting costs of purchased and self-generated power. Richard D. Searles, association president, said that high operating costs had caused the closing of the district's 7,500-kw. diesel generating plant. Diesel units will be sold and revenue applied against cost of the new steam plant. Searles said that oil for the diesels cost $1 a barrel, plus $1.50 a barrel freight. Total production cost for the units is 14 mills per kw., he said, which is three times the estimated cost of steam-generated power. The new steam plant will be fueled with natural gas, and is expected to generate power at a cost of less than 4 mills. The association bought 147,000,000 kwh. in 1949 at 7.4 mills. The district's share of Hoover Dam power will be available next year and will help supply the increasing demand for industrial and agricultural power. Construction of the new unit will eliminate need for spending $2,500,000 for conversion of generators at four hydro plants to 60 cycles. The district had been converting its 25-cycle equipment in a modernization program.

New Unit In At Waiau Plant

Increasing Hawaiian Electric Co.'s investment in its Waiau steam plant to some $16,000,000, a 40,000-kw. unit went on the line in mid-October. Hawaiian Electric now has an installed capacity of 197,500 kw. The new unit represents three years of planning and construction, and an expenditure of $5,000,000. The turbine, a Westinghouse unit, is designed for 900°F. steam temperature and 800 psi. pressure.

King County Towns Vote Municipal Ownership

In face of the Nov. 7 ballot on formation of a King County PUD, three towns within the district voted on Oct. 17 to set up their own municipal light systems. The three—Renton, Kent and Enumclaw—were expected to start condemnation proceedings as soon as legally possible to prevent a PUD from buying or condemning Puget Power properties within their boundaries. A fourth town, Kirkland, turned down a municipal ownership proposal, reportedly because voters lacked confidence in the city administration.

Sedro Woolley Also Prefers Own System

Sedro Woolley has been added to the list of western Washington cities that have voted in favor of a municipal light and power system. Voters of that city approved a $400,000 bond issue to purchase Puget Power properties. Since the Skagit County PUD already has a condemnation suit pending against the power company properties in the county, chances for the new municipal system were thought slim. Three other cities—Sumner, Buckley and Puyallup—were to vote Nov. 7 on a proposal to purchase Puget Power properties within their boundaries.

Another Unit at Grand Coulee

Another 108,000-kw. Grand Coulee generator, third this year, was scheduled for early October operation. Three more similar units next year will complete the ultimate installation of 18 generators at the Grand Coulee plant.

Offer Made for City Properties

An offer by California Oregon Power Co. to purchase the Ashland, Ore., municipal power system is being studied by the city council. Payment would be between $450,000 and $500,000.

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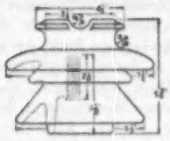
VICTOR INSULATOR
THAT SAVES
AS IT SERVES

VICTOR

TRANSMISSION PINTYPE INSULATORS

No. 245

BUILT FOR EXTRA LONG LIFE!



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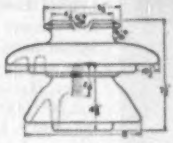

No. 245

VICTOR Catalog No.		127	245
Nominal Voltage Rating		27	45
60 cycle dry flashover	KV.	95	125
60 cycle wet flashover	KV.	60	80
Dry arcing distance	In.	7	9⅝
Leakage distance	In.	13	21
Pinhole diameter	In.	1⅜	1⅜
Cantilever strength	Lbs.	2,500	3,000
RHE (plain)	MV.	8,000	16,000
RHE (radio-freed)	MV.	100	200
1000 KC at applied	KV.	15	30

FACTS—*actual performance data* obtained from installations throughout the country—prove that VICTOR transmission pintype insulators *retain* their original high standards after *years and years* of severe service on the job. This means *extra* years of trouble-free insulator service.

The extra service-years you get in *every* VICTOR pintype insulator are a result of such built-in features as: Construction of the *best* high voltage porcelain, a rugged, *self-cleaning* design, and a *special "cushion" coating* at the joining surfaces that *eliminates* problems caused by thermal expansion.

Reap the benefits of long, dependable service—*standardize* on VICTOR transmission pintype insulators.

For more information consult our new Condensed Catalog No. 4, write us, or call your VICTOR representative.

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VICTOR, NEW YORK

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V

A Gardner transformer being loaded for shipment to a Sacramento cannery—a 1000 KVA, 3-phase, oil insulated, self cooled unit, 22,500Y volts to 2400/4160 volts with taps and tap changer through cover. The high tension terminal box is oil-filled, with potheads installed and magnetic oil gauge.

PLANNED TIME SAVINGS

Shorter production schedules even when special transformer features are required—result from the new and highly efficient Gardner Electric plant. Layout of facilities, engineering, scheduling, and production are all by transformer specialists. This means assured quality and reasonable delivery on all types of Gardner transformers.

Gardner Electric Mfg. Co.
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WEST COAST
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MOUNTAIN STATES
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GARDNER TRANSFORMERS GUARD PROFITS

THIS MONTH'S NEWS

Proposed Dams Would Add 1,000,000 Kw.

Four dams proposed for construction on the Snake River between Lewiston, Idaho, and its juncture with the Columbia River near Pasco, Wash., would provide in excess of 1,000,000 kw. of power, according to Col. W. H. Mills, Walla Walla district engineer for the Corps of Engineers.

Construction of each dam would take about four years, Colonel Mills said, with a gap of two years between projects. The proposed Ice Harbor Dam, closest to the Columbia, would be the first, followed by Lower Monumental, Little Goose and Lower Granite.

Three generators, each producing 65,000 kw., are expected to be installed in each dam, with space provided for another pair in each. Ladders and tunnels would be provided for fish moving upstream.

Ice Harbor would raise the river level 100 ft.; Lower Monumental, an additional 92 ft.; Little Goose, 100 ft.; and Lower Granite, 82 ft. Reservoirs would range in length from 27 miles behind Lower Granite to 72 miles below Lower Monumental. Each dam would have a navigation lock, permitting navigation as far as Lewiston.

Ice Harbor Dam would cost about $98,000,000; Lower Monumental, $87,000,000; Little Goose, $1,000,000,000; and Lower Granite, $91,000,000. Over-all plans have been approved by Congress but funds have not yet been allocated.

Pacific Power Pushing Big Construction Program

Construction program of Pacific Power & Light Co. in Yakima County, Wash., will total $1,759,500 this year, according to L. W. Dick, district manager at Yakima. Now under way are a $324,000 transmission substation at Grandview, costing $324,000, and two distribution substations in Yakima, costing a total of $392,000. Existing substations at Sunnyside and Toppenish are being enlarged while 12,000-volt feeder circuits will be constructed into the Naches and Tieton districts. Work on power lines will account for an additional $860,000.

EDISON SCHEDULES THIRD STEAM PLANT AT FONTANA

Southern California Edison Co. will build its third steam plant—estimated to cost $30,000,000 on a 200-acre site in Fontana, Calif. The first of two 100,000-kw. units is scheduled for completion in 1952. At the same time, the company announced that plans for construction of a steam electric generating plant adjacent to the Whittier Narrows Flood Control Basin had been canceled. The company had applied to the Los Angeles County Regional Planning Commission for rezoning a 124-acre site on the Alhambra Wash, adjoining the Flood Control Basin for the proposed plant. Hearings on the application, set for Oct. 30 and Nov. 13, were canceled by the commission.

Meanwhile, plans for the Fontana site are moving swiftly ahead. Negotiations with the Metropolitan Water District for water to be used for cooling purposes at the station are now under way.

The company now operates steam generating stations at Long Beach and Redondo Beach. Selection of the Fontana site was based on its strategic location to existing transmission and distribution facilities. Like the Long Beach and Redondo Beach steam stations, the new plant will be tied in with the company's hydroelectric generating facilities in the central California mountains and at Hoover Dam.

● A FEDERAL LOAN of $445,000 will enable the West Oregon Electric Cooperative to complete construction of two substations and 67 miles of transmission lines in Clatsop and Columbia counties in northwestern Oregon. The extension will permit service to the new United States Maritime Commission Base at Astoria and to 92 additional rural customers.

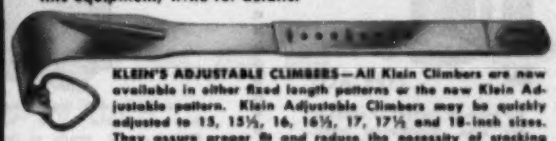
● THE SACRAMENTO (Calif.) Municipal Utility District has just installed four new substations in the north and east areas of the district at a total cost of about $128,000. The stations will add new capacity of 6,600 kva. As part of the program 3½ miles of new 60,000-volt subtransmission lines are now under construction.

● COWLITZ COUNTY PUD awarded a $34,592 contract for construction of an office building at Longview. The Wahkiakum County PUD was to open bids October 23 at Cathlamet for an office building estimated to cost $18,000, according to Manager John S. Dickson.

new additions to the KLEIN LINE

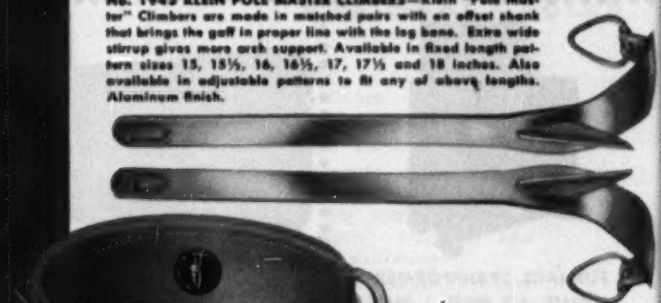
Mathias Klein & Sons continues to offer the electrical industry the most complete line of pliers and equipment on the market. Below are three additions to the Klein Line that have found favor with many utility companies. If you have not had complete information on this equipment, write for details.

Since 1857



KLEIN'S ADJUSTABLE CLIMBERS—All Klein Climbers are now available in either fixed length patterns or the new Klein Adjustable pattern. Klein Adjustable Climbers may be quickly adjusted to 15, 15½, 16, 16½, 17, 17½ and 18-inch sizes. They assure proper fit and reduce the necessity of stocking many sizes. Klein Adjustable Climbers are made of forged steel, individually tempered and tested. Aluminum finish.

No. 1945 KLEIN POLE MASTER CLIMBERS—Klein "Pole Master" Climbers are made in matched pairs with an offset shank that brings the gaff in proper line with the leg bone. Extra wide stirrup gives more arch support. Available in fixed length pattern sizes 15, 15½, 16, 16½, 17, 17½ and 18 inches. Also available in adjustable patterns to fit any of above lengths. Aluminum finish.



No. 5349 "KLEIN-LINE" TOOL BELT—This new belt is designed with a full-floating sliding trace of famous "Klein-Kord." Trace slides freely, allowing approximately 6 in. movement. Chafing is avoided, and undue wear on safety strap is prevented. Apron design permits visual inspection of trace throughout its entire length.

A soft, pliable latigo leather cushion 4¾ inches wide is pad-lined and edge rolled for comfort. The 2-inch wide belt shape is of heavy harness leather with a drop forged buckle. Made in following sizes: 36, 38, 40, 42, 44 and 46 inches.

Ask Your Supplier Foreign Distributors: International Standard Electric Corp., New York

The New Klein Catalog giving full information on the complete Klein line will be sent on request.

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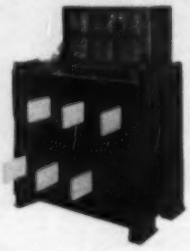
TYPE ACO

All purpose, indoor or outdoor, dry type distribution transformers. Sizes to 100 KVA, voltages to 5000 V.

TYPE C

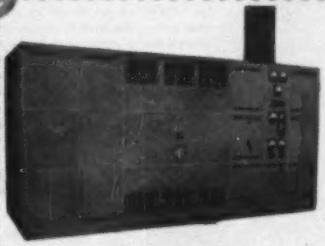
General purpose transformers, 600 volts and below; 1-15 KVA inclusive, single or three phase completely self contained.



FURNACE TRANSFORMER

3 PHASE, 3/2 PHASE, 1 PHASE

Uses—Forging, heat treating, melting, resistance heating, welding, etc.



TYPE F - UNIT SUBSTATION

1000 KVA, 4160Y 60 Cycles, 3 Ø —480 delta; Fused, load interrupter on H.V. (left). Drawout type breakers and metering equipment on L.V.

ONE OF THE WORLD'S LARGEST MANUFACTURERS OF DRY TYPE TRANSFORMERS EXCLUSIVELY

1 to 2,000 KVA up to 15,000 Volts to meet Individual Requirements

- DISTRIBUTION
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- PHASE CHANGING
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- RECTIFIER
- WELDING
- MOTOR STARTING
- SPECIAL

MTC produces a complete line of quality transformers to 2000 KVA. A newly expanded plant with the most modern equipment, plus a background of years of dry type specialization, assures maximum transformer value.

MTC

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40 MONTGOMERY STREET

HILLSIDE 5, NEW JERSEY

PUD HYDRO DEVELOPMENT SUBJECT OF SURVEY

The Lewis County PUD of Chehalis, Wash., expected an engineering report by Nov. 1 on proposed construction of a $7,000,000 hydroelectric project at Packwood Lake, some 85 miles east of Chehalis.

The report which if favorable will be the basis of an application to the Federal Power Commission, is being compiled by W. S. McCrea, consulting engineer of Tacoma. Tentative plans call for construction of an 80-ft. dam at the lake outlet, with a large steel pipeline to a power plant producing an average 24,000 kw, with a peaking capacity of 33,000 kw. Head would be 1,600 ft. for a single-stage or 800 ft. for a two-stage plant. A transmission line would be constructed some 35 miles to Morton, where it would feed into a Bonneville line serving Chehalis.

Cost of the project could be reduced to as little as $4,000,000 or increased to $12,000,000 by decreasing or increasing its scope. Capacity of the plant could be increased by diverting water from a number of creeks in the area.

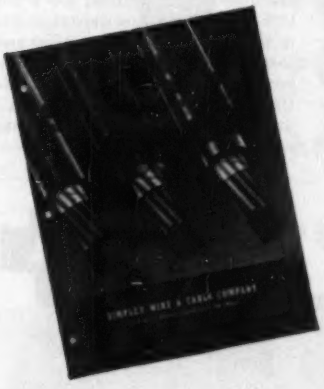
The Lewis County PUD, managed by Carl Miller, now has no generating capacity, purchasing $233,316 worth of power last year from the Bonneville Power Administration. The proposed plant would meet the PUD's needs except at peak demand and low-water periods. Under certain conditions, it would have surplus power to sell to the Northwest Power Pool.

Additional Funds Will Set Chief Joseph Dam Ahead

Chief Joseph Dam will be completed one year earlier than originally planned because of an additional $6,529,000 made available to the Corps of Engineers, Lt. Col. John P. Buehler, district engineer at Seattle, has reported. The first four generators will go on the line in December 1955; the remaining 16 will be installed at the rate of four a year. Bids for second-stage construction will be opened Nov. 9 at Seattle.

● SOUTHERN CALIFORNIA EDISON CO. has purchased a site in Long Beach for its district headquarters. Construction on the three-story building, estimated to cost $500,000, will begin next June. The site is at Fifth Street and Locust Ave., Long Beach.

for Low-Cost, Trouble-Free Operation of Signal Control and Communications *Circuits..*



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- Light in Weight
- Small in Diameter
- Have Low Capacitance and Attenuation

THEIR POLYETHYLENE INSULATION ...

- Is Thin-wall; permits more conductors per cable for a given diameter, more circuits per conduit
- Has High Dielectric Strength and High Insulation Resistance
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- Resists Water and Moisture, Oils, Chemicals, Sunlight and Aging
- Features Low Cracking and Shattering Temperatures

THEIR PLASTEX JACKET ...

- Is Tough yet Flexible
- Remains Stable Over a Temperature Range of about 200 F.
- Resists Cracking down to —58 F.
- Provides Protection against Abrasion, Oils, Chemicals, Flame, Sunlight and Aging
- Is available in three types to meet all conditions of Aerial, Conduit, and Underground Service

Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

ARIZONA EDISON PLANS EXPANSION AT DOUGLAS

Arizona Edison Co. plans a $300,000 expansion at its Douglas, Ariz., plant to accommodate a steel grinding ball and casting plant to be constructed by Douglas Foundry Inc.

The Douglas foundry is a subsidiary of Seattle Foundry Co. Inc. of Seattle, Wash., and will provide balls and castings for the Phelps-Dodge Co. copper mine at Bisbee and the Douglas smelter.

Reid Gardner, president of Arizona Edison, said the installation will increase plant capacity in the area to 7,500 kw., 1,100 of which will be consumed by the foundry.

A diesel dual fuel unit and other electrical equipment needed to form the new generating unit in the present power plant are on order.

● TACOMA, Wash. city council has authorized the lighting division of the city's department of public utilities to proceed by contract or force account with installation of a third penstock for an additional turbine generator unit at Cushman power house No. 2. Estimated cost of the work totals $320,000, of which $169,000 is for installation of turbine, valves and piping. Allis-Chalmers will supply the generator and turbine under an $850,000 contract and supply supervision for the installation. Completion is scheduled for Oct. 1 next year.

● HIGH-INTENSITY lighting will be provided in the twin approach tunnels to the Lake Washington floating bridge under a contract awarded Holert Electric Co. by the City of Seattle. Design provides for a general intensity of 3½ f-c. Photocell-controlled transition lighting of 100 f-c will be used at entrances during daylight hours. The installation is part of the city's $4,000,000 street lighting modernization program affecting 334 miles of arterial streets.

● THREE SMALL ELECTRIC companies in eastern Oregon, serving 590 customers, have sold their properties to a REA finances cooperative. The companies disposing of their interests are Mitchell Power & Light Co. of Mitchell; Spray Electric System of Spray, and Ukiah Power & Light Co. of Ukiah. The sales were approved by Oregon Public Utilities commissioner George H. Flagg.

ROSS DAM POWER HOUSE TO HAVE MORE UNITS

Contracts for additional equipment for the Ross Dam power house have been awarded by the city purchasing agent at Seattle, Wash.

The Newport News Shipbuilding & Drydock Co. of Newport News, Va., will furnish three 192-in. butterfly valves for $607,500 while the Woodward Governor Co. of Rockford, Ill., will supply the governors for $123,000. Installation is scheduled for completion early in 1953.

Contracts for three 90,000-kw generators and three turbines previously have been awarded to Westinghouse and Baldwin, respectively, while power house excavation is nearing completion by the firm of Peter Kiewit Sons Co.

● MOUNTAIN STATES POWER Co. has asked FPC authorization for a $990,000 issue of 3% first mortgage bonds, to be issued in November 1950 and to mature in November 1980. It proposes to sell the entire issue to John Hancock Life Insurance Co. at a per unit price of 101% of principal amount.

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Die Cast* ALUMALLOY
FITTINGS and FIXTURES
The Complete Line for a Complete Job

It's easy to specify and follow straight through on every installation with the complete Killark all-purpose line. There's a Killark fitting or fixture adaptable to each of your needs.

The Killark combination of high strength, lightness, safety, and uniformity—plus the factor of corrosion-resistance of Alumalloy—assures advantages never before attainable, advantages designed for years of uninterrupted service. Yes, for easier installations, for better installations, thousands now prefer Killark—*first* in Die-Cast* ALUMALLOY.

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WRITE for Illustrated Bulletin describing Killark All-Purpose Line.

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Killark
ELECTRIC MANUFACTURING COMPANY
Vandeventer and Easton Aves. St. Louis 13, Mo.

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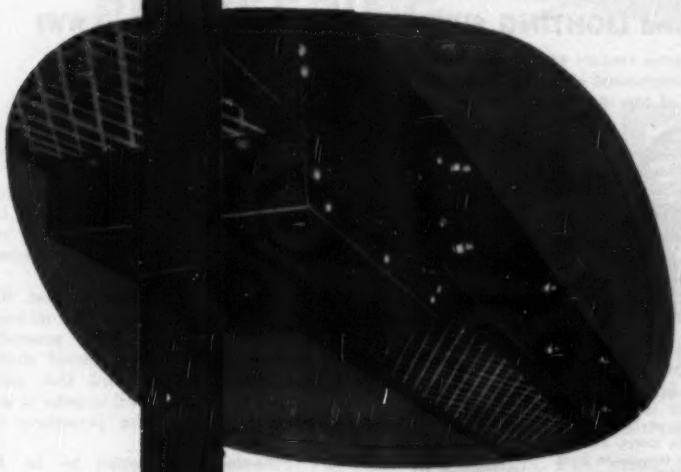
are *Yours* with NATIONAL ELECTRIC

LO-LOSS FEEDER BUS

- Fits into Riser Bus applications because of the light weight to be supported, the small amount of space occupied and ease of installation. Underwriters' approved for vertical risers.
- Branch circuit take-offs can be made at various floors.
- Insulated copper bars on close centers result in minimum voltage drop and high efficiency.
- Factory fabricated sections to meet job requirements save time in making the installation.
- Flexibility eliminates separate branch circuits and long conduit and cable runs from main switchboard.



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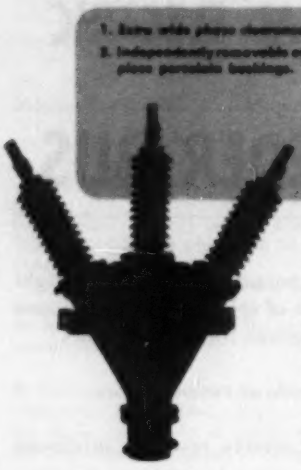
YOUR POWER CABLES ARE ONLY AS GOOD AS THE TERMINAL PROTECTION PROVIDED

Three E capnut style CABLE END BELLS have many outstanding features which assure trouble free operation.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2. Independently removable one piece porcelain bushings.
3. Bushings clamped to bell body, not cemented.
4. Adjusting nut on terminals to compensate for errors in cutting cable leads.
5. Side opening cover plate. (A great aid at time of installing.)
6. Oil resisting gaskets throughout.

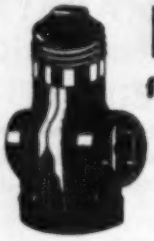
Capnut style cable end bells are available in seven body shapes, for voltages 2500 to 46000 volts single conductor and to 23000 volt multiple conductor.

We also have a complete line of open bushing style of cable end bells for indoor service.

Write for bulletins 501 and 502.

Next time you have a cable terminating problem consult Three E.

ELECTRICAL ENGINEERS EQUIPMENT CO.
MELROSE PARK, ILLINOIS



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No. 204. In brown Bakelite and ivory Urea. Efficient and lasting. Has shadeholder ledge. 660W-250V.

MOLDED TWIN LITE SOCKET
No. 205. Attractively designed in heavy, brown Bakelite and ivory Urea. Practical unit. 660W-250V.

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No. 202A (left) Heavy Bakelite shell, with molded Bakelite insert. Bronze contact. No. 203—same style with rubber shell and Bakelite insert. No. 206 (right) Pin type—has suspension hook. No soldering. 660W-600V.

All items listed by UL
Write for Prices and Catalog

KULKA KULKA ELECTRIC MFG. CO
30 SOUTH ST. MT. VERNON N. Y.

PUD ENGINEERS WILL SURVEY POWER COMPANY PROPERTIES

An agreement between the California-Pacific Utilities Co. and the Union County (Ore.) PUD permits an examination of the company's properties and invoices by engineers of the district. The survey will be directed by W. B. McCrea of Tacoma, Wash.

The PUD is seeking to acquire the properties of the company in Union and Baker counties, in eastern Oregon, through condemnation proceedings. In an answer filed in federal court to the PUD's suit, the company challenges the right, under Oregon law, of a PUD to bring condemnation proceedings against a private utility, alleging that provisions of the Oregon statute "purporting to grant the right of eminent domain" to Peoples Utility Districts is void because of "indefiniteness and uncertainty."

The answer also charges that the Union County PUD does not have on hand sufficient funds to compensate the company fully for the properties it seeks to appropriate.

Before filing the condemnation suit the PUD offered to purchase the properties involved for $1,500,000. Regarding this proposal the answer says the offer represents only a fraction of the damage which the company would sustain in loss of the properties.

Commission grants one WWP Request, Turns Down Other

The Washington State Public Service Commission has granted the application of the Washington Water Power Co. of Spokane to borrow $7,150,000 in short-term bank loans for construction purposes but denied its request to borrow $3,850,000 to retire 35,000 shares of $6 preferred stock.

In denying the latter request, the commission said it could "see no convincing necessity of WWP presently retiring its existing preferred stock, but rather is convinced that such should be delayed until it seeks to accomplish its plan for permanent financing."

Proposed construction to be financed by the loans includes transmission line improvements amounting to $2,641,900 and production plant improvements costing $365,000.

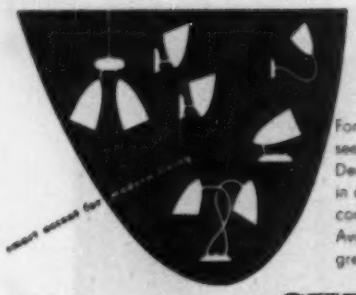
Of the amount authorized for construction, $4,500,000 previously had been approved, this authorization now being extended to Oct. 31, 1951.

PIONEERING *in Hydraulic* POWER –

The Pioneers - those who devoted their lives to the harnessing of one of nature's mightiest forces - water - contributed greatly to this nation's progress! For 75 years, we have built turbines for high, medium and low heads, many types of valves, hoists and gates, pumps, trash rack rakes and kindred hydraulic equipment. Put your problem up to us.

S. MORGAN SMITH Co.

YORK PENNA U.S.A.



For the finest in contemporary lighting see Prescolite's new Swiv-O-Lite line. Decorative distinction and rigid construction in a wide range of functional designs for commercial portable and pin-up installation. Available in six decorators finishes—coral, green, gray, satin chrome, brass and bronze.

PRESCOLITE'S new **SWIVOLITE**

to complement the popular Prescolite recessed fixture line. Write today for complete catalog and price information.

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your best source for commercial, portable and pin-up modern lighting fixtures

Ever-Ready

PIN TYPE

Sockets offer the most convenient and economical means of obtaining outdoor or indoor temorary lighting, since the tedious stripping, soldering and taping operations are eliminated.

In street decoration, construction lighting, carnivals, roadside stands, etc., their ease of installation and convenient flexibility is unsurpassed.

Insist on UNION'S PIN TYPE SOCKETS—the FIRST and the BEST.

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No. 44408 Intermediate

Sockets

No. 11108 Candelabra

UNION INSULATING CO.

PARKERSBURG, WEST VIRGINIA

NEWS ABOUT PEOPLE

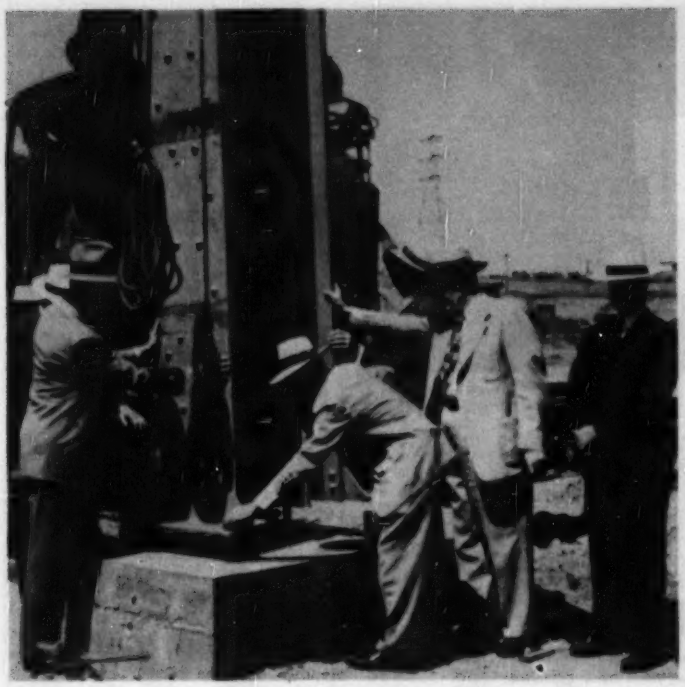
● DALE E. MACKENZIE has been appointed district representative of General Electric ranges and water heaters, replacing HOWARD OLIPHANT, who was made local manager of appliance sales in Seattle, Wash. MacKenzie will have his headquarters at San Francisco. He was formerly headquarters representative at Bridgeport for the range and water heater division.

● W. G. "Bill" HALL of Westinghouse Electric Supply Co. in Fresno, has been promoted to appliance sales manager for the territory from Kern County line through Stanislaus County.

Goodell

● LEONARD N. GOODELL, former manager of the Chicago plant of the manufacturing and repair department for Westinghouse, has been transferred to Sunnyvale, Calif., where he assumes duties as assistant to the Pacific Coast district manager of the department. He will have charge of Westinghouse plants in Los Angeles, Portland, Seattle, Salt Lake City and Emeryville. Goodell will have headquarters at Sunnyvale.

● APPOINTMENT of WORRELL F. PRUDEN as assistant chief engineer of Columbia Steel Co., was announced recently by PAUL F. KOHLHAAS, vice-president, engineering. Pruden was previously with Consolidated Western Steel Corp., Los Angeles, where he was chief engineer.



President J. E. Loiseau of Public Service Co. of Colorado, left, Vice-President M. M. Koch, center, W. D. Virtue and Fred L. Witsell lend a hand to swing into place the first column of the third 40,000-kw. unit of the company's new 120,000-kw. Arapahoe steam-electric plant in South Denver. First 40,000-kw. unit is scheduled for operation late in 1950

● CLARENCE W. SHERMAN, personnel officer for Puget Sound Power & Light Co., Seattle, has resigned to become assistant business manager of the Seattle Times. He has been with Puget Sound Power & Light for 28 years. PATRICK JOHNSON, vice-president and general sales manager, will assume the duties of personnel manager. FRANK BAKER and LOUIS T. MATTER have been appointed assistant personnel managers.

● GEORGE L. RICHARDSON Jr., is newly appointed district service supervisor for General Electric's appliance and merchandise department in the Pacific district. He has been district service representative in San Francisco for the past three years. In his new post he succeeds J. R. DAVIS, who was recently appointed to the division's Bridgeport headquarters. PHILIP KLEIN succeeds Richardson as district service representative.

● BEN ROHWEDDER, service supervisor for Thomson-Diggs Co. in the San Francisco area, has been transferred to the Fresno territory as sales representative for the company. JEAN HUFFMAN succeeds Rohwedder in San Francisco.

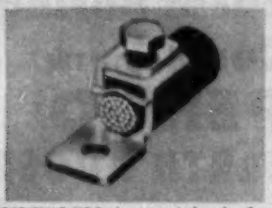
● L. M. LARKIN is the new Western regional sales manager of General Electric's air conditioning department. He will cover California, Nevada, Washington, Utah, Wyoming, Oregon, Arizona and Idaho, with headquarters in San Francisco. Branch offices will be maintained in Seattle, Los Angeles and Salt Lake City.

● C. E. WILLIS, formerly assistant sales manager of the electromechanical division in charge of Lear's West Coast sales and field engineering activities, has been advanced to chief engineer of the company.

● DAVID L. BROWN has become sales promotion specialist for General Electric Lamp department in northern California, according to Frank M. Falge, Pacific district sales manager for the department.

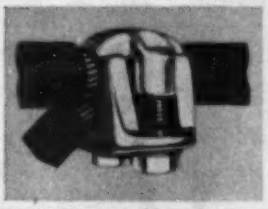
● C. R. BENSON has been appointed manager of sales for General Electric's Oakland transformer plant. He has been with G-E since 1926.

PLANT WIRING GOES FASTER WITH—



SCRULUG KPA—Low-cost, indoor lug for service switch, terminal block and similar connections. Ideal in close quarters. Installed with screwdriver or pliers—convenient cable range in each size.

QIKLUG QA-S—Rugged, compact, withstands stress and vibration. Installed with wrench. No separate parts. Each unit takes convenient cable range.



QKLIP KVS—Heavy duty service connector, affords high contact pressure between cables. No loose hardware, rounded edges for easy taping.

VERSITAP QPX—Can be used as a tee, tap, cross, parallel or end connector. Takes a wide range of cable combinations.

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He's equipped to promptly serve your Burndy connector requirements from stock. He can also help you with both Burndy special-purpose and Hydent line connectors.

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BUILT TO ORDER IN A HURRY!!

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Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

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DENVER 2
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MAin 4912

● General Electric Supply Corp., Salt Lake City, announces changes in its sales organization. Arty W. Clark, who has been covering northern Utah as supply salesman, has left the company to become associated with Idaho Falls Electric Co. Mitchell Daich, former lamp specialist with General Electric Supply in that area, replaces Clark. Gale H. Patterson takes over as lamp specialist, and Dave Gray replaces Patterson in the lighting department.

● California Electric Power Co. has announced the advancement of William V. Casebeer to the position of district manager of the Victorville District, and John W. Savage to the post of acting district manager for the Blythe area. Casebeer succeeds Reg. Knaggs, who resigned. Savage takes over his new job replacing Karl McGowan, who was recalled to active duty in the Navy as an electronics specialist.

● Harry L. Headington, system operation, has been promoted from junior operator to operator at the Little Falls power plant of Washington Water Power Co. Phil Buchholz was recently transferred from operator at the former Eastside substation to journeyman lineman, Spokane distribution lines.

● Roy B. Cole, chief electrical mechanic for California Electric Power Co., has retired. He has been with the company for 38 years, starting as switch operator in San Bernardino, later electrician and relief dispatcher. In 1942 Cole was advanced to chief dispatcher and in 1946 became chief electrical mechanic.

● Albert Moore, electric pumping plant operator in the mechanical engineering division of Los Angeles Department of Water & Power, has retired after 39 years of service with the company.

● Frank Edin, who has been associated with North Coast Electric Co. for a number of years, is now with Love Electric Co. of Tacoma. He is a part owner of the firm.

● Warren E. Fleetwood, dealer sales promotion representative in Utah Power & Light Co.'s Salt Lake Division, retired recently with a record of 40 years of service in the electrical industry.

● Samuel L. Friedman is the new director of public relations for Los Angeles Department of Water & Power, according to Samuel B. Morris, general manager.

Load-balancing is important to Hotpoint, too!*

Industry figures indicate BIG potential for these low saturation appliances

*Dishwasher and Disposall® Saturation: less than **2%**

*Food Freezer Saturation: less than **5%**

*Automatic Clothes Dryer Saturation: less than **1%**

*Rotary Ironer Saturation: less than **9%**

*Automatic Clothes Washer Saturation: less than **10%**

Hotpoint Inc.

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FLOOR
BOXES
and ACCESSORIES
UNIQUE FEATURES
MODERN DESIGN
PRECISION-BUILT
COMPACT CONVENIENT
A complete line of sturdy Watertight Floor Boxes, single or gang types; Combination Floor Extension Sets, Floor Outlet Type Receptacles, Heavy Duty Floor Receptacles & Plugs.
Get the INSIDE STORY
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for
• IMPROVED COMMUTATION
• MORE UNIFORM WEAR
• LOWER OPERATING COSTS
U. S. Pat. 2,181,876
Yes, Helwig-Speer Multiflex Brushes give you the "big three" of motor and generator performance. The best in design and materials means: (1) uninterrupted contact, (2) reduced vibration, (3) reduced circulation current, even wear. What's more, you get double-brush advantages with single-brush simplicity. Multiflex fits conventional single-brush holders. For complete information on ordering brushes, write for Catalog 95.
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THE ONLY 100% MERCURY SWITCH EQUIPPED CONTROLS
Designed to automatically regulate electrically operated equipment in accordance with changes in temperature, pressure, vacuum, or fluid level.
If you have a problem on the automatic control of pressure, temperature, liquid level, mechanical operations, etc., it will pay you to consult Mercoid's engineering staff — always at your service.
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MANUFACTURERS OF AUTOMATIC CONTROLS FOR HEATING, AIR CONDITIONING, REFRIGERATION AND NUMEROUS INDUSTRIAL APPLICATIONS. ALSO MERCOID BRAND MERCURY SWITCHES

● THREE vice-presidential appointments of Kaiser Aluminum & Chemical Corp. and Kaiser Aluminum & Chemical Sales, Inc., Oakland, were announced recently by D. A. Rhoades, vice-president and general manager. They are S. S. INCH, vice-president in charge of sales; THOMAS J. READY, Jr., vice-president; DON E. BROWNE, vice-president and treasurer. At the same time RUSSELL A. CLAYTON was appointed controller of Kaiser Aluminum & Chemical Corp.

● JOHN J. NIELSEN has been transferred from the Los Angeles office of Westinghouse to Salt Lake City where he assumes duties as agency and specialties division representative. Nielsen has been an application engineer for Westinghouse for the past 21 years.

● COLUMBIA STEEL CO., San Francisco, has made three appointments to its metallurgical staff. They are R. A. SCHAUS, alloy, stainless and tubular products; B. W. BUIST, senior service metallurgist, southern division; D. C. WILDE, service metallurgist.

● WALTER T. LUCKING was recently promoted to a vice-president of Arizona Edison Co. at Phoenix. He has been assistant to president Reid Gardner. Lucking has been with Arizona Edison since May 1.

● PRESTON CHERRY has been appointed sales manager of the white goods division of Kaemper-Barrett, San Francisco. Cherry was formerly associated with the H. R. Basford Co. in San Francisco.

● CLARENCE E. LINDSTROM, who has been with Philco for 18 years, has been named Western sales manager for the company, with San Francisco headquarters. He replaces CLIFF S. BETTINGER, who retired recently.

● MORRIS P. BUSWELL, application engineer with Westinghouse for the past 17 years, has become manager of the company's agency and specialties division for the Los Angeles area.

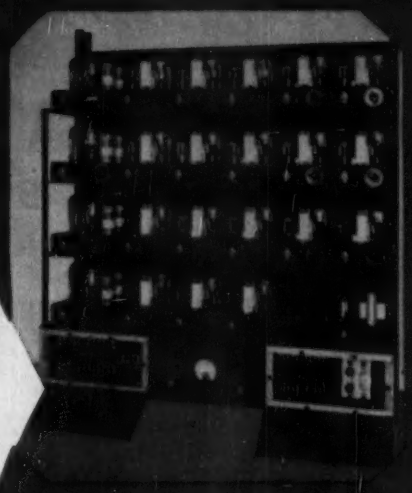
● DALCO APPLIANCE CO., San Francisco, announces the appointment of CONRAD MALNIK as assistant advertising and sales promotion manager.

● CARL A. WOLFROM, 69, retired Salt Lake division manager for Utah Power & Light Co., died recently at Palo Verdes Estates, Calif. He was a veteran of 44 years of service in the power industry. Mr. Wolfrom was Salt Lake division manager from 1927 until his retirement in 1947.

NEW

DRIVER-HARRIS ELECTRONIC TESTING

Obsoletes Previous Methods of Testing Enameled Wire Insulation



This revolutionary Dielectric Continuity Tester at Driver-Harris checks the quality of coating on 19 strands of wire simultaneously—as the wire leaves enameling furnaces. Tap switches on the test units are calibrated in impulses per minute required to operate an alarm. With the speed of the wire known, and also the maximum number of faults per 100 feet permitted by specification, each test unit is readily set to operate in conformance with the terms of the test imposed.

In order to guarantee the quality of a spool of enameled wire, *every inch* of the wire should be checked for dielectric faults, not just a few feet. In general practice, however, only a short sample of wire is examined. This is passed through a mercury cup held at a fixed potential, and shorts through the insulation are indicated on a voltmeter. If faults do not exceed a specified maximum for a given length of wire, insulation throughout the *entire* spool is assumed to be satisfactory.

This inefficient, compromise method has two important disadvantages: (1) the small portion of wire tested may not truly represent the condition of insulation throughout the spool; (2) insulation failures are not discovered until long after the enameling process is completed.

By checking insulation *continuously*, as wire leaves the enameling furnaces—the only 100% dependable way—Driver-Harris' new test equipment obsoletes such ineffectual and wasteful procedure.

So long as specifications are met, the new Driver-Harris electronic tester permits the enameling process to continue uninterrupted. When the *rate* at which faults occur approaches the maximum number of faults permitted by specifications, the test mechanism sounds an alarm and a record is made on a moving chart.

In this way, enamel coating is not only tested for continuity throughout the entire length of spooled wire, but sub-standard enameling is detected—and can be corrected—as soon as it occurs.

Thus makers of wire-wound resistors—particularly in finer sized wire, where shorts are more likely to occur—are enabled to eliminate time-waste and material-waste in their production, and obtain superior, more dependable products.

Makers of world-famous Nichrome and over 80 alloys for the electrical, electronic and heat-treating fields*

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1114 Valencia St., San Francisco 449 So. San Pedro St., Los Angeles

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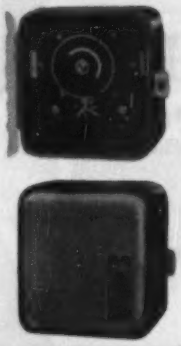
UTILITY TIME SWITCH

When selecting automatic time switches for indoor and outdoor uses remember the advantages of dependable TORK CLOCKS. Ideal for — Signs and Window Lights — Pumping — Defrosting — Oil Burners — Pre-heating — Lead or Wax — Hen House lights. Write today for complete details.



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For long life and quiet operation choose Thomas "Q-T" insulators. There's one for every operating voltage.

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Phone SUtter 1-7352
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E-M Service Masts are the perfect support for service wires on ranch type houses and low commercial structures that do not provide sufficient ground clearance to comply with National Electrical Code requirements (2322 a. & b. 1947).

E-M Service Masts are neat rugged units that require no guy wires. They look good, are hot galvanized to last a lifetime. Developed in cooperation with utility engineers and electrical contractors.

WRITE FOR BULLETIN 21

Electrical Manufacturing Co.
Pole Line Hardware
153 Angell St., BATTLE CREEK, MICH.

NOTES ON THE TRADE

Submarine Cable Contract Let by Bonneville

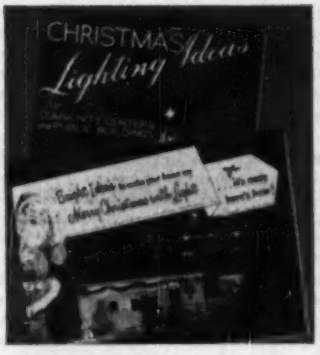
Power is to be supplied to the San Juan Islands in Puget Sound by the Bonneville Power Administration over a submarine cable installation to be completed in May 1951. BPA let a $409,754 contract to the Okonite Co. for the cable. The cable, reputed to be the largest continuous-piece cable in the world, will be a 3-conductor, 300,000-cir. mil rubber-insulated, armored, 25,000-volt cable (illustrated). It will be manufactured in continuous length

of 38,000 ft. and shipped on eight gondola cars.

A 27,000-ft. length will be laid in 200 ft. to 350 ft. of water under Rosaria strait between Fidalgo substation on the mainland, 3 miles west of Anacortes, Wash., and an island terminal on the east shore of Decatur Island. A 2-mile overhead line will cross to the west shore of the island, where a second cable length of 11,000 ft. will cross Lopes Sound to a terminal on Lopes Island. From there a 2,000-ft. overhead line will interconnect with the Orcas Power & Light Co. system.

● Bellilove Co., San Francisco, announces its appointment as northern California representative for Fenwal Inc., manufacturers of Fenwal thermoswitch, Detect-A-Fire, and related temperature control and detection systems.

How to have more homes in your community look like this at Christmas time



1 Encourage your customers to decorate with light indoors and out by providing them with practical suggestions for attractive Christmas lighting. One way to do this is to make available General Electric's how-to-do-it booklets (one for homes, the other for community centers and public buildings) that are packed with new ideas for Christmas lighting.

2 Build community interest in Christmas lighting by helping to promote home, commercial, and industrial lighting contests. General Electric's new portfolio, "How Every Community Can Conduct a Christmas Lighting Contest", tells you clearly and completely how to organize, promote, and operate successful lighting contests in your community.

3 Time your promotional activity to tie-in with General Electric's big Christmas lighting promotion. There'll be full color ads in Life, Saturday Evening Post, and Better Homes and Gardens — plus spot radio and the Fred Waring Television Show. It'll all help make more folks decorate with light this year than ever before.

GENERAL ELECTRIC

First three of nine 30,000-kva., 230/115-kv. single-phase autotransformers have been delivered to Bothell substation of Seattle City Light. Each weighing 150,000 lb., they were shipped from the G-E plant at Schenectady by rail, the trip requiring about six weeks. Bothell substation north of Seattle will be the terminus of four 230-kv. lines from the Skagit project, two 230-kv. lines to South substation and a BPA connection to Snohomish sub. Two 115-kv. lines will feed Broad St. and North subs. Operation is scheduled for 1951

Walter Geist, president of Allis Chalmers Co., third from right, accomplished something of a miracle by gathering together the company's board of directors and chief executives and taking them with him on tour of Allis-Chalmers properties. Here he had them at Point Mugu, near the new plant recently completed at Oxnard to manufacture tractors

● ALLIS-CHALMERS Co. did an extraordinary thing. It loaded its entire board of directors and chief executives on a Pullman and took them to visit every one of its nine plants scattered over the United States. Among them was its tractor plant at Oxnard. In the cities in which it has major offices the group also stopped, visited, discussed business programs and problems, gave press conferences and in some cases held luncheons to which the company's agents and customers were invited. Walter Geist, president, personally shepherded the group, spoke briefly at the meetings, was interviewed by the press, said the company was in excellent position to deliver defense material required of it and whatever civilian production it can get materials to fabricate.

● SLAYBAUGH and THOMPSON Co., Denver, are newly appointed sales representatives in the Mountain States area for Sola Electric Co., designer and producer of constant-voltage transformers. The area assigned to the Denver firms consists of Colorado, Wyoming, Utah, Idaho and New Mexico.

Firm Sales Force Holds Western Get-together

A Western get-together of the construction materials department representatives of General Electric Co. was held at Sonoma Mission Inn, Calif., to review sales programs and to learn of new products and developments, late in September. George West of San Francisco played host to the group, which included J. J. Lengyel, sales manager, construction materials department; George Wiskman, manager of wiring devices and accessory equipment division; Joe Overstreet, sales manager, wire and cable division; and W. Rex Becker, sales manager, conduit products division of the company. All district representatives of the northwest and southwest districts attended. Included were: Dan Flinn, district manager, Pacific district, Los Angeles; W. W. Bryan, Northwest district manager, Seattle; George West, district representative, San Francisco; W. J. Delehanty, manager, Oakland wire and cable plant; Floyd Good, Portland; Lloyd Shackelford, wire and cable specialist, Seattle; John Mandan, R. B. Lord and A. E. Olsen, San Francisco; George Kingshot, manager, Pacific District watehouse, Los Angeles; E. G. Hall, W. R. Rivers, C. H. Ford, E. F. Feyrer and L. F. Cudlin, wire and cable specialist, all of Los Angeles, and L. B. Johnson, Salt Lake City. The new oil and gasoline resistant wire with an extruded extra coating and new potentials in the remote control residence wiring system were major items on the agenda.

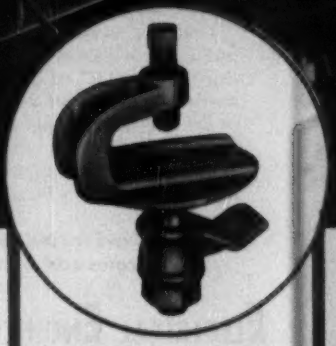
● TO MEET its increasing West Coast demands, Federal Electric Products Co. of Newark, N. J., has established a West Coast factory at 2855 E. Washington Blvd., Los Angeles 23. The Los Angeles factory will manufacture switchboards, panelboards, cans and other distribution equipment built to customer specifications, according to Leonard P. Shelly, manager of the branch.

● WHOLESALE RADIO & SUPPLY Corp. has become distributor for Kaye-Halbert television in the San Francisco area. At the same time it was announced that SAUL HONIG, formerly with Herbert Horn, Los Angeles, has been appointed sales representative for Kaye-Halbert, covering the San Fernando Valley and Hollywood.

● T. L. ROSENBERG Co., pushed out of its own building on Fifth St., Oakland, by a new freeway, is moving to a new shop and office at Fourth Ave. and E. 17th St., Oakland.

INSTALL CONDUIT FOR KEEPS

with APPLETON "STA-TITE" Pipe Hangers



Type "PHS" for use with single conduit.

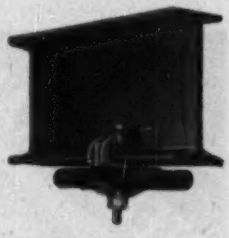
Firmly, Permanently Grip Both Rigid and Thin Wall Conduit!

For ruggedly dependable performance under the most severe service conditions, standardize on Appleton "Sta-Tite" Pipe Hangers.

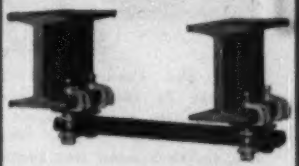
Easy installation of these sturdy pipe hangers is assured by clean threading, smooth finish, expert over-all design.

Made of tough Malleable Iron in Appleton's own foundries and fabricating plants, "Sta-Tite" Pipe Hangers speed and simplify complex jobs—enable you to run conduit parallel to the beam, at right angles or at any angle in between.

Whatever the wiring requirement, you'll find the exact fitting you need in the 15,000-item Appleton Line. For faster completion of better jobs, specify Appleton—STANDARD FOR BETTER WIRING.

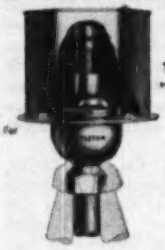


Type "PHD" with two conduits parallel with structural shape.



Type "PH" with strips for suspending groups of pipe from structural shapes.

APPLETON
SAFETY SWIVEL HANGERS



TYPE "SSH"

Patent Applied For

Designed to assure adequate support for heavy duty lighting fixtures used in industrial installations. Entire weight of suspended unit is carried by a fixture stud, greatly increasing load capacity of hanger unit.

WRITE FOR COMPLETE CATALOG INFORMATION

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

1709 Wellington Avenue • Chicago 13, Illinois

LOS ANGELES 12, 100 N. Santa Fe Ave.

SAN FRANCISCO 1, 655 Minna Street

SEATTLE 9, 115 Ray Street

DENVER 2, 1921 Blake Street

APPLETON ELECTRIC PRODUCTS

APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

A HANDY POWER WIRING DEVICE

The "Three E" CLAMP INSULATOR SUPPORT is a handy and most useful device in power wiring.

It is easy to install, economical in price and "Three E" has ample stocks to provide prompt shipment.

They are available for insulated conductors ranging from 5/16" to 3½" outside diameter, for pipe or flat mounting, single or multiple conductor.

In factories, mills, mines, power and substations, vaults etc., they make an ideal device for supporting cable runs and all open wiring.

Send for bulletin 201. It describes, illustrates and dimensions the complete line.

ELECTRICAL ENGINEERS EQUIPMENT CO.
MELROSE PARK, ILLINOIS

ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information

INDIANA STEEL & WIRE CO.

It Pays to Advertise in Electrical West

The epic story of population and industry migration Westward rivals the gold rush migrations of 1849-50. Added to the already rich and stable market afforded by the region, they make the West the nation's preeminent market for electrical equipment, materials and appliances. These are the factors that warrant special SALES and ADVERTISING attention to this market. ELECTRICAL WEST blankets the market, completely and intensively and its value as a sales builder is attested by 247 advertisers who regularly use its pages to pave the way for their salesmen.

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO
ROCHESTER 1, N.Y.
Write For Free 1950 Catalog

Costal Finish is a new non-corrosive treatment for distribution transformer cases developed by Westinghouse Electric Corp. The new finish is a three-coat mica-base paint process highly resistant to corrosion. Each coat functions cooperatively with the others to withstand the oxygen, acids, salt and alkalis found in seacoast and industrial atmospheres. An air drying modification of the process makes possible field patching of a transformer should the surface be damaged. Tests on both the California and Florida coasts indicate a life of more than double that of the ordinary distribution transformer finish. Preparations are rapidly being completed at the Sunnyvale, Calif., plant of Westinghouse to use the new costal finish. All units coming from Sunnyvale after mid-November or early December will be so finished

● GENERAL ELECTRIC SUPPLY Corp. has opened its new 71,000-sq. ft. warehouse in Emeryville, Calif. The one-story warehouse and facilities, costing approximately $500,000, more than triples the former warehouse facilities on the Oakland side of San Francisco Bay. E. W. Garcia, Oakland manager of G-E Supply, has moved his headquarters to the new building, which is located on a 104,000-sq. ft. tract, recently purchased by the company. Ample parking facilities for customers is a feature of the new project.

● JESS CROWE & Co., Marysville, Calif., has been appointed exclusive northern California distributors for Continental Radiant Glass Heating Corp. of New York. Dealers in Sacramento will be served by ROBERT J. HILL, covering that area for the Crowe company.

● BOYD ENGINEERING Co. has become sales representative for Reliance Electric and Engineering Co. in Arizona, New Mexico and the western part of Texas. Boyd maintains offices in El Paso, Albuquerque, Phoenix and Monterrey and Chihuahua, Mexico.

ALLIS-CHALMERS

POLE-TYPE
⅝% STEP REGULATOR

per Customer per Year?

LOW VOLTAGE CAN COST YOU THAT OR MORE!

OPERATORS WHO LOOK at 105v or 110v as *"adequate"* for feeders are losing from $4 to $8 annual revenue for every customer. Now that most appliances are rated 120v instead of 110v, you can lose many thousands of dollars if you permit voltage to stay at a level that was once considered adequate. It costs money *not* to regulate voltage!

There are several ways to raise voltage and cut revenue losses. Regulators are a common method. But there's a big difference in regulators! For example, a regulator that holds a narrow 2 volt band can maintain average voltage 1 volt higher than a regulator holding a 4 volt band.

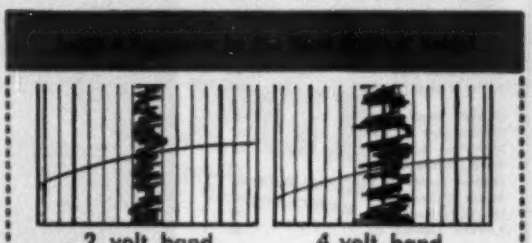
Band width is therefore the real way to judge a regulator. Allis-Chalmers pole type step regulator is the only pole type step regulator on the market today that holds a 2 volt band.

The band width advantage can be used in any one of these three ways:

1. You can use it to increase revenue.
2. You can use it to increase load-carrying capacity.
3. You can use it to extend feeder length.

Hundreds of these regulators are already in use. Find out what the narrow band width of Allis-Chalmers pole type step regulators can mean on your lines. Call your nearby Allis-Chalmers Sales Office for the complete story. A-3181

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.



The Allis-Chalmers pole type regulator is the only pole type step regulator that can hold a narrow 2 volt band. Use the band width advantage of this regulator to hold higher average voltage. Get quicker return on dollars invested in regulation.

ALLIS-CHALMERS
Originators of ⅝% Step Regulation

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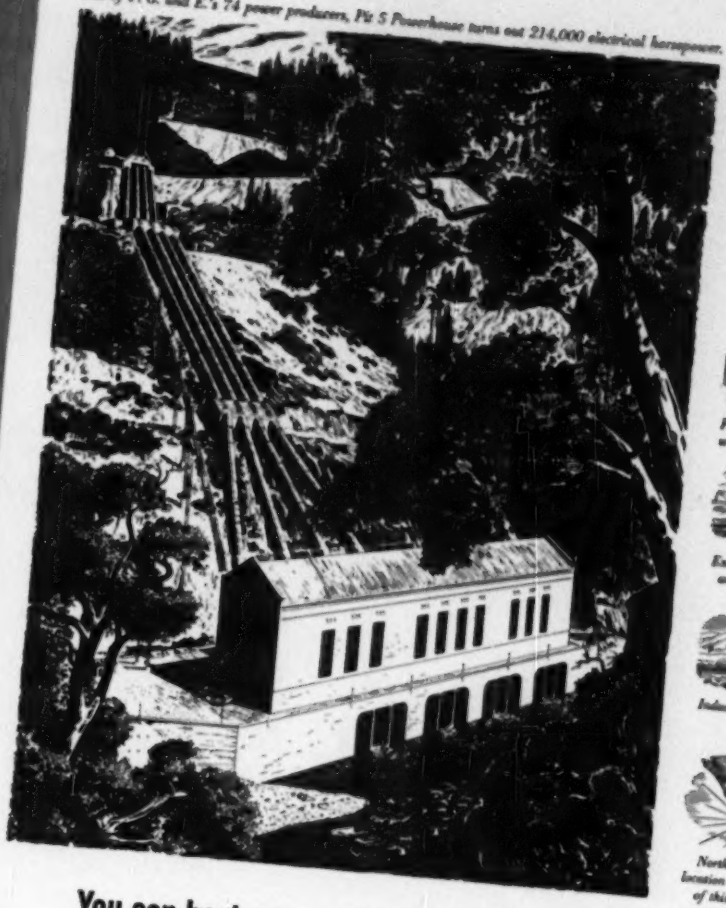
PROFILES

In cap and gown the Class of 1900 joined San Francisco Electric Club's Half Century Club to open the fall meetings. Honored were Earl Fisher, A. W. Flanagan, Steve Gamble, C. B. Kenney, R. C. Powell, A. E. Rowe, Charles X. Schmitt, R. W. Shoemaker, and E. A. Wilcox, who was absent. Below them at another head table sat members of previous classes. A real pioneer in power development among them was Eugene De-Sabla, after whom a PG and E division and power plant are named. Ray Turnbull presided

More oldtimers among California electrical contractors held a sort of reunion at the NECA convention in Los Angeles. In the balcony of the Biltmore ballroom perched Ed Grogan, manager of the chapter at Stockton; Roy Butcher, San Jose. State Contractors Board chairman; Lou Doust and Fred Bussell, San Francisco, and Rolly Goold, Stockton

One of P. G. and E.'s 74 power producers, Pit 5 Powerhouse turns out 214,000 electrical horsepower.



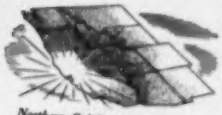
Wonderful living...plenty of room, sunshine...fine schools, recreation.

Abundant resources close by...metals, oil, lumber and many others.

Fine supply of skilled and semi-skilled workers who want to live in the West.

Excellent transportation...land, sea and air...reaching all the world.

Industrial sites...lots of strategically located land available.



Northern California's accessible location can put you right in the heart of this 20 billion dollar market.

You can best serve all the West from Northern California

There's a mighty market in the 11-state West . . . as many businesses have found. It's the nation's fastest growing market—2.3 times the national average. In centrally located Northern California the population has jumped over 50% in ten years. California's individual income has tripled —farm income is over two billion dollars a year.

In this growing area, P. G. and E. is completing its great postwar expansion program—largest in the country. By mid-1951, nearly 4,000,000 h.p. will be available in our interconnected system. We'll keep building ahead of the growing demands of the area. Rates are among the nation's lowest. Write us for exclusive studies of industrial sites.

PG and E

Pacific Gas and Electric Company, San Francisco, California

To bring more industry into your community,

we're advertising Northern California's advantages to millions of out-of-state businessmen. This campaign explains why it's wise to buy, build and expand in the heart of the industrial West. The nation's top managers and officials will read these sales messages as they appear in *Time, Newsweek, U.S. News and World Report, Business Week, Forbes, Fortune* and *Wall Street Journal.*

11AX-50

PREVENT

ADEQUATE WIRING
SERVES
SAVES

PACIFIC COAST ELECTRICAL ASSOCIATION

601 WEST FIFTH STREET, LOS ANGELES 13 · 447 SUTTER STREET, SAN FRANCISCO 8